ARCHIVES OF OTOLOGY.

A CASE OF DOUBLE CEREBRAL ABSCESS WITH FISTULA INTO THE VENTRICLES; OPTIC APHASIA; RECOVERY.[1]

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IT has not become necessary, as yet, to find excuses for the publication of cases of recovery from cerebral abscess, especially when they show such a complicated course as the one here reported. It is not my intention to enter upon any general questions, but to restrict myself to the report of this one case, for the reason that in the near future a larger paper treating of this subject will be published from this clinic.

To begin with an extract from the history:

Dec. 30, 1896.—Mrs. M., forty-two years of age, had had typhus as a child, and, in consequence, discharge from the ear. Since then there has been an almost constant offensive discharge and deafness left; never headache, only at times slight dizziness. Since yesterday severe headache, vomiting, and fever; to-day loss of consciousness, never any paralysis.

Status præsens.—A tolerably strong woman, somnolent, faintly groaning. Right ear normal. Left: in the auditory canal, bad smelling pus, tolerably thickened; upon removal of the same, the drum is found missing, and two granulomata about the size of peas are seen suspended from the tegmen tympani; here, there is decidedly rough bone to be felt. Tests for hearing impossible.

Fundus oculi: right, about normal; left, papillary boundary somewhat indistinct; no hyperæmia, no dilatation of vessels.

[1] From the University Ear Clinic at Strassburg.

Pulse 54, tolerably hard and regular. Temperature 38.7°. In the urine no albumen, no sugar.

Diagnosis.—Extra-dural or cerebral abscess, probably in the middle cerebral fossa, respectively the temporal lobe. I suggested an immediate operation, which was performed by me the following day, with the assistance of Drs. Lobstein and Scheele.

Dec. 31*st.*—Operation under chloroform; ⅂ cut above and behind the ear, dissecting off the periosteum to a considerable extent; the bone found everywhere intact and of white color. Upon chiselling it is found hard as glass. Before the antrum is opened the dura is reached in the region of the middle cerebral fossa, or rather a purulent, gelatinous, infiltrated, thickened membrane, which pulsates strongly and shows itself to be the dura. Between it and the bone there is a little thin pus rhythmically forced out of the cerebral cavity synchronously with the cerebral pulsations. The typical radical operation (without plastic) was now made; antrum, aditus, and tympanic cavity are found filled with pus, granulation tissue, and bone fragments. Nothing is left of the ossicles except a small piece of the incus in the epitympanic recess. Tegmen tympani and antri are removed with a few blows of the chisel. The dura shows here, too, the purulent, gelatinous condition spoken of above. More and more bone is removed until healthy portions of the dura are found. After this a trial puncture is made into the pulsating temporal lobe; the withdrawn syringe is almost entirely filled with thick pus. The bone wound is now further enlarged toward the squamous portions, so that the defect here is about the size of half a dollar, and one can survey a large portion of the lateral parts of the temporal lobe and its base (above the tegmen antri et tympani). Then a large incision was made into the temporal lobe from within (tegmen tympani) outward in a frontal direction, which opened the abscess. It was found that all the membranes of the brain had grown together with the cortex around the abscess to form the abscess wall. The wall is about 7–8 *mm* thick at the thinnest portion, which was about the squama. About 100 *cu cm* of thick, offensive pus flowed out of the abscess. The remaining contents, which were in part hemorrhagic, were then removed with a sharp spoon, the lips of the abscess wound being held apart with hooks. Two fingers were then carried into the abscess cavity, which was found closed in everywhere by a tolerably thick wall, which showed, upon illumination, a yellow color. The greater portion

of the abscess lay in the region of the temporal lobe, but extended tolerably far backwards, undoubtedly into the occipital lobe. After being wiped out with sterilized gauze, the cavity was filled with iodoform gauze, and the wound back of the ear left open. During the emptying out of the abscess, pulse and respiration had remained unchanged. No prolapse of the brain in spite of the strong pulsation. After the operation, slight facial paresis in the lower branch.

Jan. 1st, 1897.—Patient slept well, is fully conscious, converses, takes some nourishment, is, however, tolerably apathetic. Pulse 88, regular. Temperature 37.0°–37.1°.

Jan. 3d.—Headache; pulse somewhat slow, 62. Temperature 36.7°–37.1°.

Jan. 4th.—Change of dressing. Considerable secretion of odorless pus from the abcess cavity; still a good deal of apathy. Temperature 36.9°–37.0°.

Jan. 5th.—Pulse 70, temperature 37.0°–37.1°. Patient slept well. Though asking for nothing to eat, she eats with appetite when something is given her. Shows to-day distinct signs of aphasia; can not recall the word teeth, saying, upon being asked to whistle, that she never could whistle, as she had no—what do you call them?—in the mouth. She calls keys knives, yet recognizes a knife very well; upon being shown a cigar, she says "that is to smoke"; a brush, "that is to dress the hair." She cannot recall the words themselves, however, although she takes the articles in her hands and feels them. Only upon telling her the first syllable is she able to conclude the word, as in cigar (ci). She can, however, repeat every word spoken to her. In the urine no albumen, no sugar. Fundus: In both eyes the cloudiness of the papillary border has increased, the vessels also seem veiled, but show no dilatation.

Jan. 6th.—Change of dressing. Bone- and skin-wounds without reaction. Upon removal of the tampon from the abscess cavity, however, a large quantity of thick, offensive pus shoots out of the cavity. Upon carrying in the finger, one comes upon a second cavity toward the front having rough walls. This is curetted, the entrance to the old abscess is enlarged by cutting off a piece of the wall (cortex and membranes), and both abscess cavities tamponed with iodoform gauze. From the old wound opening one can now carry the finger in, as well 6 *cm* backward as forward. During all these manipulations, the patient remained

sitting up in bed, without pain, without vomiting, with only considerable increase in the frequency of the pulse. In the evening, temperature 38.1°, pulse 86.

Jan. 7th.—Change of dressing. There are still large quantities of pus and necrosed cerebral substance emptied out of the anterior abscess cavity. Temperature 37.2°–37.4°.

Jan. 9th.—Temperature 36.7°, pulse 84. General condition good, no headache. Wound shows only a little serous secretion. Aphasia continues. Patient unable to recognize a large number of objects shown her—for instance, matchbox, borer, penholder, etc.; knows their use, however, and can repeat words spoken to her; she cannot recall the names of most objects, even though she takes them in her hand; she tries to smell a matchbox. In conversation, only a few of the principal words seem to fail her, these she tries to replace by using describing sentences for them.

Jan. 13th.—Fundus: still a slight cloudiness of the vessels and papillary border, left more than right.

Change of dressing. Both abscess cavities are now clean and show only a serous secretion. One can see, upon illuminating the cavities anteriorly, the separating white layer of brain matter between the two abscesses quite clearly; in this curtain-like dividing wall, which has about the thickness of a quarter, there is a hole of communication between the two. This layer is removed with forceps and scissors, so that one can look fully into both cavities; the one latest opened extends forward and inward, the other backward and inward. Both show well granulating surfaces.

To-day a more exact examination of the aphasia was made. Patient recognizes all objects as to their uses, but fails often to give their names, although she can repeat the names if spoken to her. She fails to recognize a bell held up before her; only upon hearing it ring, she says very joyously, "bell." She can not always remember the names of many objects, even though she handle them. There is also a slight paraphasia. A mirror is called spectacles. If one places before the patient eight or nine objects, and tells her to pick them up singly, while one calls out the name without pointing to them, she does this promptly. Reading and writing normal, visual field also normal.

Jan. 20th.—Abscess cavity somewhat smaller. Temperature, 36.6°–37.1°; pulse, 70.

Jan. 24th.—Patient slept well, has good appetite, aphasia still

remains. Change of dressing. For some time it has been noticed that there is no actual pus on the gauze taken out of the cavity, this being saturated with a more serous secretion. To-day, upon removing the gauze, a large quantity of light, clear fluid flows out of the cavity over the neck and shoulder of the patient. Upon illuminating, a necrotic spot is found toward the posterior horn, next to which there is a small, three-cornered slit, about 2 *mm* in size, out of which liquor cerebro-spinalis flows with each pulsation of the brain. Careful loose tamponage.

Jan. 26th.—To-day, upon changing the dressing, there is no great flow of cerebro-spinal fluid. Temperature 37.1°–36.9°.

Jan. 31st.—Every third day the dressing is changed. Moderate secretion. No more discharge of light fluid from the posterior angle of the abscess. Where the fistula had been, there was now a yellow coating; pulsation especially strong here. Entire cavity greatly diminished in size. Temperature 36.9°–37.1°.

Feb. 6th.—Change of dressing. The secretion emanates principally from the posterior angle of the abscess; pulsation strong at this point. Slight feeling of dizziness. Temperature 36.1°–37.1°.

Feb. 15th.—Abscess cavity still the size of a walnut, coated everywhere, in the posterior cornu also, with red granulations.

Feb. 21st.—Patient up for three days, is feeling perfectly well; wound growing smaller, tympanic cavity epidermisized for the most part. Aphasia can no longer be demonstrated.

March 11th.—Patient dismissed from the hospital, further treatment being out-door treatment. The wound back of the ear is still the size of a quarter; within it, a red, pulsating cerebral wound can be seen, which is flat, forming, however, no cavity. From its lower extremity a granulating wound-funnel projects into the tympanic cavity.

May 31st.—Dismissal. The surface of the wound has been covered over with skin for the past three weeks; from the tympanic cavity, there still flows some purulent secretion, for the treatment of which sublimate-alcohol is prescribed. Patient goes to the country for after-treatment, feeling quite well, being without pain, and having increased in weight. Whispered speech: 1 meter. Facial paresis cured. The flow from the ear has also ceased entirely.

The history shows this to be a very complicated case of cerebral abscess.

To begin with, it had been difficult, or rather impossible,

to make an exact diagnosis, because the patient was entirely somnolent and had never shown any symptoms of localized lesions.

In consequence of the symptoms of compression of the brain (the slight neuritis optica, the slowing of the pulse, the unconsciousness), on the one hand, and the existence of old purulent middle-ear trouble, with caries of the tegmen tympani on the other, it was possible to conclude that there was an accumulation of pus in the middle cerebral fossa; one had to leave undecided, however, the question as to whether this abscess lay extra-dural or within the brain. The opening of the cranial cavity alone could decide it. It is not necessary to waste words over the method of operation; it goes without saying that the radical operation (after Zaufal) should be performed in such doubtful cases, opening both cranial fossæ, being guided in further action by the local condition found. The operation showed one case to be, first, an extra-dural abscess, or rather a purulent pachymeningitis externa, and, secondly, a cerebral abscess.

The pachymeningitis externa, which is not a rare complication of otitic cerebral abscesses, was identified by a pathological change, which consisted less in a large accumulation of pus between the dura and the bone than in a purulent, gelatinous condition of the dura itself. The latter showed inflammatory adhesions with both soft membranes and with the cerebral cortex. Such a firm, fibrous adhesion between the cerebral membranes and the cortex is to be looked upon as a decidedly favorable complication of cerebral abscess, affording, as it does, a relatively good protection against threatened purulent leptomeningitis upon opening the abscess.

A further complication noticed in our case, was the existence of a second cerebral abscess. The discovery of the latter was due to a fortunate accident. For, in consideration of the immediate marked improvement of the patient after the operation, the presence of any further complication was not suspected; neither could the slight increase in the pathological changes in the fundus lead us to this

thought, for this condition is not unusual during the first days after the opening and emptying of a cerebral abscess (Zaufal[1] and others). It must therefore be considered as an exceptional piece of good fortune to find upon changing the dressing on the sixth day after the operation, a second abscess emptying itself spontaneously into the first.

The contents of this abscess, which was of the same offensive purulent nature as the first, pointed also to a long duration thereof. Both occupied a very great portion of the space of the left cerebral hemisphere. For from the point of entrance just above the tegmen, I could pass the whole length of my little finger (6 *cm*) forwards into the cavity as well as backwards, making the length of the cavity 12 *cm.* The white medullary substance was principally affected by the two abscesses, the cortical substance being entirely free.

As the two oblong abscesses did not extend in a directly sagittal direction, but inclined somewhat in front as well as in the back toward the median line, and also in consideration of the great width of the cavities, it was remarkable, that no communication with the lateral ventricles, especially with the posterior cornu, was noticeable. After emptying the pus during the operation, I had illuminated the entire cavity carefully with the electric lamp, and also examined all parts with my fingers, without discovering anything but the yellow membrane lining the cavity. Only later, when this abscess-membrane had been cast off, could a communication between the abscess-cavity and the ventricle be found. This had evidently existed for some time before I had noticed it. For though I had noticed for several days, upon changing the dressing, that the gauze taken out of the cavity was not really soaked with pus, but with a thin, light, clear fluid, still I regarded this serous secretion as produced principally by the granulating surface, now that all diseased parts had been cast off.

Only on the day when a light, clear fluid flowed from the cavity over the neck and shoulder of the patient in a stream did the idea occur to me that a ventricular fistula might have formed subsequently, and I illuminated and searched the

[1] Zaufal. *Prager med. Wochenschr.*, xxi., 1896.

cavity again. Then I could indeed discover in the posterior median angle of the oblong cavity a fine three-cornered slit out of which cerebro-spinal fluid was emptied with every pulsation. We have thus the rare complication of a ventricular fistula, and that a fistula of the posterior cornu. The history of the case shows us that such a ventricular fistula can very well be closed by granulations and be fully healed, provided that the process of repair be going on otherwise.

Again, remarkable to me, even though I had met with a similar state in other cases, was the utter painlessness, to this otherwise sensitive patient, of all manipulations upon the cerebral substance, such as curetting, cutting, etc.

One symptom which deserves special interest I should like to discuss briefly, namely, **the aphasia.** This was characterized in our patient by the following phenomena:

1. The patient absolutely could not designate objects in spite of the fact that she knew their import: saying, for example, of a cigar shown her, "that is to smoke," of a brush, "that is to dress the hair," etc.; at the same time she was able to repeat without failure words spoken to her.

2. Sometimes (though not always) she succeeded in recollecting the name of an object by making use of another sense besides that of sight—for instance, the sense of touch. but more especially the sense of hearing. She could not, for instance, upon looking at a bell tell the name of it; but upon hearing the bell ring, could immediately name it. This she did, too, with a small drum and with an empty water-glass,

3. She sometimes mixed the names of objects, calling a mirror spectacles, a key a knife.

The last of these three symptoms, the paraphasia, was not very clearly defined and only showed itself in naming a few objects; this can have been caused by the severe lesion of the temporal lobe on the one hand, whereas, on the other, it is not to be denied that the anterior abscess lay in the region of the isle, alterations of which are also made answerable for paraphasia.

The two other varieties of disturbance of speech are somewhat more interesting, as they indicate a form of aphasia which has only in later years attracted the attention of neurologists to any great extent.

The incapability of the patient to name objects about whose import he is fully conscious, there being at the same time no incapability of repeating words, was formerly called amnesic aphasia; when, however, the patient names objects properly through the mediation of an additional sense, as, for instance, touch, hearing, etc., which he cannot name by means of sight alone, we have that form of disturbance of speech before us which is usually called **optic aphasia.**

And just this variety was present in our case, as can be seen by the above report, whereas word-deafness, as well as, on the other hand, real motor aphasia was entirely missing.

This form was first exactly described by Freund,[1] after Naunyn[2] had differentiated two principal forms of sensory aphasia, the acoustic form, or aphasia with word-deafness, and the optic form, or aphasia with word-blindness. Freund places the lesion in these affections in the connecting tracts between the occipital and the temporal lobes, in that region which Naunyn considered a third cortical field, the two others being the already known ones of Broca (3d left frontal convolution: motor aphasia) and Wernicke (upper temporal convolution, sensory aphasia). Oppenheim[3] observes in reference to this point: the abscess is not uncommonly so placed that it breaks through the tracts which connect the sound image centre with the optic centres. It is probable that the localization in the lower and posterior portions of the lobus temporalis fulfils these requirements. He observes also that it is just in these cases that optic aphasia becomes more prominent—"that is, the patient is not able to transfer the visual impressions to the centre of speech in order to name the objects seen, whereas he can find the names of those objects in another way, for instance, by touching, smelling, tasting, or by means of association of ideas." Oppenheim refers also to a case of optic aphasia, published by Jansen,[4] in which it was principally the sense

[1] Freund, *Arch. f. Psych. u. Nervenkrankheiten*, Bd. xx., S. 276.
[2] Naunyn, *Verhandlungun d.* vi. *Congr. f. innere. Med.*, Wiesbaden, 1887.
[3] Oppenheim, *Fortschr. d. Med.*, 1895, S. 738; *Lehrbuch d. Nervenkrankheiten*, 1894.
[4] Jansen, *Berlin. klin. Wochenschr.*, 1895, No. 35.

of touch which assisted the sense of sight in the naming of objects. Zaufal and Pick (*l. c.*) have published a highly characteristic observation, which in the principal points is a true copy of my case: there too the abscess lay in the medullary substance of the left temporal lobe; there too there was optic aphasia with slight paraphasia, in which the optic aphasia was characterized by the fact that in the naming of objects both touch and hearing aided the incompetent sight, though not always with success, a phenomenon to which Oppenheim also has previously called attention. Our case is certainly of less value than Zaufal's for local diagnosis, because there existed not only an abscess in the posterior parts of the temporal lobe, lesions of which are made answerable for optic aphasia, but also an abscess taking in other more anterior regions of the brain.

The entire disturbance of speech disappeared in our patient after a time, as is generally the case when these abscesses run a favorable course.

CONTRIBUTIONS TO THE KNOWLEDGE OF PYÆMIA.

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Translated by Dr. Arnold H. Knapp, New York.

NOTWITHSTANDING recent publication of a number of excellent papers on pyæmia, opinions on the origin of certain forms of this affection still diverge. Pyæmia following complete sinus thrombosis is a well established picture; but those forms of pyæmia, with a different course of symptoms and which have been especially described by Körner, require our further study and attention. Hessler and Brieger wish to consider this latter variety as a simple otogenous pyæmia without involvement of the sinus, and Körner calls it pyæmia through osteo-phlebitis. This group is chiefly characterized by the difference in the seat of the metastases, or their entire absence, its occurrence in conjunction rather with the acute than the chronic suppuration in the temporal bone, and the much better prognosis.

Leutert[1] has drawn attention to the parietal sinus thrombosis as the beginning of otitic pyæmia; a condition which has not received sufficient recognition. To decide the question whether the cases of pyæmia presumably without sinus involvement are cases of partial sinus disease or of parietal thrombosis, it is clear that as large a material as possible should be collected. I have observed the two following cases which seem to me to be relevant.

Case 1.—A. M., fourteen years old, was taken ill in the begin-

[1] *Arch. f. Ohrenheilk.*, vol. xvi., Nos. 3 and 4.

ning of March, 1897, with fever and right-sided earache; the symptoms were somewhat relieved on the appearance of a purulent otorrhœa. After several days of comparative good health the boy had a chill, vomited, temperature 40.4° in the night of March 12th. During the following days the patient appeared very sick, temperature remained up, slight otorrhœa. The mastoid was not swollen, and tender only along anterior border. Percussion of the skull was nowhere painful; pupils re-acted normally.

March 15th.—Operation. The mastoid process was very hyperæmic, the bone softened, but very little pus was found. The antrum contained granulations and a little pus. Everything that appeared diseased was carefully removed, and it was decided to postpone the exposure of the sinus as there had been no further chill, the fever was not of the pyæmic type, and no metastases had appeared. One hour later patient had a chill lasting fifteen minutes. Fundus oculi normal. Temperature 40.1°. On the following day, temperature 36.6°; the patient was quite comfortable. At 10 o'clock he went into collapse, then coma, and death on the following day.

Autopsy.—The dura is tense. The sup. longitud. sinus contains freshly coagulated and fluid blood. The pia is intensely congested. The lateral ventricles are dilated and contain clouded serum. The brain substance seems normal. The right lateral sinus as well as the other sinuses on the base of the skull contain fluid and freshly coagulated blood. After removal of the dural covering, the outer wall of the right sigmoid sinus was found to be unevenly thickened and covered with tough granulations; corresponding to this position on the inner wall of the sinus there was an elongated thrombus with a broad base $1\frac{1}{2}$ *cm* long, which projected into the lumen of the sinus, and in its central portion was necrotic and purulent. The bone corresponding to the diseased area was very thin and necrotic. The tympanum contained pus and granulations. No hemorrhages in the endocardium. Lungs hyperæmic, the spleen and kidneys large and soft. The stomach contained some altered blood.

Case 2.—E. G., twelve years old. Several weeks ago, after a tonsillitis, suffered with pain in the left ear, fever, and later otorrhœa. I saw the patient on March 21, 1897, and found a doughy swelling over the left mastoid process, which extended back over the occiput and was very tender. The otorrhœa was scanty and

the perforation in the drum membrane could not be seen. Temperature 38.4°.

March 22d.—Operation. The mastoid process was filled with pus, and the entire external bony wall was removed. In exposing the most posterior mastoid cells the mastoid vein was injured and bled freely. The antrum contained granulations and pus. An area of diseased bone was removed, which proved to lead to the lateral sinus. The sinus was freely exposed and its wall was found to be thickened and covered with granulations for 1½ *cm* in length. The diseased bone was carefully removed and the wound plugged with gauze. The fundus oculi was examined on the next day and was normal. The fever dropped during the two following days, and then during the next eight days followed the typical pyæmic course, fluctuating between 36.0° and 39.4°. Enlargement of the spleen could not be discovered, no metastases appeared. The wound healed and the patient was cured after six weeks.

REMARKS.

The rapid course of the disease in the first case is interesting. It evidently was a true intoxication by the extreme virulence of the toxine, which caused death before typical pyæmia was developed. The rapid course, the prolonged high fever, the patient's euphoria, the gradual unconciousness, and the gastric hemorrhages speak for this view. Therefore, according to the grade of virulence of the toxic substances, we have a rapidly fatal form, otitic sepsis of Körner, or a less virulent form with the clinical symptoms of pyæmia.

The sinuses must be carefully examined for thrombi at the autopsy, for it was only after we had removed the sinus from its bony wall and had spread it out that the thrombosis was found in the first case. This case also teaches us always to expose the sinus in cases with very high temperature even without the signs of pyæmia.

In regard to the second case, I feel it necessary to state my reasons for supposing the presence of a parietal sinus-thrombus. At the operation the outer sinus wall was found diseased and exactly similar to the sinus-lesion in Case 1. Notwithstanding the removal of all diseased bone, the fever of a pyæmic type persisted for several days. As a total sinus-

thrombosis and its consequences did not occur, three conditions were probable: an osteo-phlebitic pyæmia, a parietal thrombus of the sigmoid sinus or a thrombosis of another sinus. As the wall of the sigmoid sinus was found actually diseased, the second condition, that of a parietal thrombus, is the most probable.

Both of these are cases of acute affection of the temporal bone; it is as yet impossible to say whether parietal sinus-thrombosis follows acute cases more frequently than chronic.

ON MILD CASES OF MIDDLE-EAR TUBERCULOSIS AND THE ACCOMPANYING FORMATION OF FIBRINOID.

By Dr. A. SCHEIBE (Munich).

Translated by Dr. Arnold H. Knapp (New York).

THE presence of the characteristic tissue-changes due to Koch's bacillus proves the diagnosis of tuberculosis, still they furnish no clue as to the course of the disease. The course of tubercular disease depends upon entirely different factors. First, the localization is of importance. Tuberculosis of the skin is less dangerous than that of the mucous membranes. Furthermore, the age of the patient has great influence. We cannot, therefore, blame the practitioner for still maintaining a distinction between scrofula and tubercle, though both clinical pictures have the same etiological factor. A tubercular catarrh of the apex may in one patient remain stationary for years, while in another lead to a fulminant consumption in a short time; the difference in clinical course is due to hereditary influences, to the general condition—the clouded idea of the phthisical habitus plays a not unimportant nor unjust part,—and to the more or less favorably surrounding circumstances.

The same conditions hold good for the ear. Clinical experience teaches us that there is a severe and a mild form of aural tuberculosis. In the case of the middle-ear, which is the part of the auditory organ most frequently affected in tuberculosis, we know that the affection may be cured, though the anatomical conditions have been most unfavorable. The destruction of a small tubercle in the thin mucous membrane not only destroys this membrane but lays the bone

bare to serious nutritive disturbances. In addition, the middle-ear is especially exposed to the feared mixed infections.

It would lead me too far to add to the list of cured cases a number of others, but I shall have to speak of two cured cases later on in another connection.

Cases of cure are rare, more so than in other organs. This is due not only to the unfavorable anatomical relations, but to the fact that most cases of middle-ear tuberculosis occur in subjects with far-advanced phthisis, where the body can no longer offer any resistance against the tubercle bacillus. This phthisical variety of middle-ear tuberculosis is the most frequent and shows a pronounced tendency to destruction of tissue. It has but recently been fully described by Hegetschweiler in cases of Bezold's clinic.

Between these advanced cases and those which get well, there are a number of intermediate forms where the tubercular process does not disappear or advance, but comes to a standstill. It will be my endeavor to describe the latter form of cases. They do not occur as often as the advanced forms, though more frequently than has been thought, and even more frequently than we have found. The reason for this non-recognition has been due to absence of the characteristic symptom, the progressive destruction of tissue, which is typical for the advanced cases, and because the other symptoms were absent or were not sufficiently regarded.

Such has also been our experience in the six cases which I wish to report. We had them under observation without making the right diagnosis. The appearance of our symptom, which deserves more general importance, aided us in making the right diagnosis in all cases. One of these cases belongs in the list of the cured, while the remaining five are not the only ones of stationary middle-ear tuberculosis which we have observed. I shall restrict myself to these six cases because they are the only ones where this symptom was present.

Three of the patients were children and three were adults, though in two of the latter the disease dates from childhood. The otorrhœa had existed for 1, 2, $2\frac{3}{4}$, 9, and 35 years.

The otoscopic examination shows the entire absence of the drum-membrane in five cases; in the sixth the perforation is central and situated in the anterior half. In most of the cases with total perforation, parts of the hammer and of the long arm of the incus are wanting. Bare bone can be felt at these defects and in other places. The mucous membrane of the middle ear in five of the patients with total perforation is partly changed to epidermis, and in two of the cases the commencement of the aditus as well. No accumulation of cholesteatomatous masses in the upper middle-ear spaces were to be found.

The parts of the tympanic mucous membrane which were not changed to epidermis were partly granulating, partly only swollen. Polypoid hypertrophies were noted in three of the cases. The Eustachian tube in one case was impassable, in the others it was unusually patent. The mastoid processes were normal. The discharge usually was mucous and odorless. The mucous or muco-purulent discharge often came away in small ball-like masses, and persisted after months of treatment.

Hearing was in most cases greatly diminished. In one patient whispering voice (numbers) could be heard at 50 *cm*; this is the only case where after cessation of the otorrhœa the hearing power increased to $2\frac{1}{2}$ *m*. The lower tone-limit was correspondingly reduced in all of the cases. In two of the three children a chronic otitis media purulenta existed on the other side.

Our examination in these cases revealed the usual chronic purulent otitis. It is remarkable that in almost all cases a total destruction of the drum-membrane was present without that any sufficient cause, like scarlet fever, could be elicited. The patency of the Eustachian tube and the considerable loss of hearing did not make us suspicious of tuberculosis, as the general appearance of the patients was excellent. In the subsequent course of the disease the discharge became scanty, though it was impossible to arrest it completely, although various methods of treatment were adopted, except in one case where a cure was brought about after $2\frac{1}{2}$ years.

One symptom abruptly led us to the correct diagnosis; it did not appear before ¾ to 6 years of treatment. On the occasions of the patient's complaining of a freer discharge without known cause, we made a careful otoscopic examination and found the following condition: Situated on the inner tympanic wall, usually on the promontory or near the tubal ostium, there was a grayish thick membrane which could not be removed; occasionally bare bone could be felt with the probe through this membrane. The membrane adhered for a long time, and thereby differs from the membrane on the drum-membrane and bony wall of the auditory canal found in otitis externa crouposa. The condition of the membrane remained stationary from two to six weeks, when small pieces were dislodged by sprouting granulations, and in a few weeks more the entire membrane disappeared. The granulations contracted and became covered with epithelium or epidermis as before. The otorrhœa again became scanty and persistent.

This membranous formation has returned in only one patient after a length of time several times. In this respect also is the process different from the otitis externa crouposa acuta. As we had observed a similar process in the advanced form of middle-ear tuberculosis (Bezold [1]), we immediately made an examination of the discharge for tubercle bacilli and found them present in all cases in numerous quantities. The membrane was also found to contain tubercle bacilli. After the disappearance of the membrane repeated examinations of the discharge proved negative, except on two occasions.

When the correct diagnosis of the middle-ear affection had been made, we examined the patients for other signs of tuberculosis. In all, more or less distinct evidence of tuberculosis was found; but these changes were not pronounced and either were healed or showed a tendency to healing. In five of the cases the ear trouble was secondary, in one it was questionable.

The difference in the clinical picture of the just-described type and the advanced form of middle-ear tuberculosis is

[1] *Arch. f. klin. Med.*, Bd. xliv.

striking, and depends chiefly on the general health. As the health of those with the mild form of aural tuberculosis is good, so the course of ear trouble is benign. There was no destruction of tissue, at least at the time the patients came under our observation. The mucous membrane is granulating and a large part of the middle-ear is covered with epidermis. In the phthisical patients granulations are very rare, and epidermis-formation does not occur. The prognosis as to life in our cases is not unfavorable. The otorrhœa is equally persistent in the two groups. The mild form of middle-ear tuberculosis resembles chiefly the usual chronic purulent otitis. The membrane which we have described will aid in the diagnosis, but is transient in appearance and may not occur for years. The discharge must therefore be examined for bacilli, and the patient for any other sign of tuberculosis.

The total defect of the drum-membrane, the free patency of the Eustachian tube, and the considerable diminution of the hearing power are of some importance for a group of cases but not for a single one. When a case of chronic otorrhœa does not yield to regular antiseptic treatment during years, tuberculosis must be suspected in cases where the otorrhœa is not complicated with cholesteatoma. I have not been able to find Koch's bacillus in the cases of chronic purulent otitis with cholesteatoma.

The histological examination of the above-mentioned membrane has shown that it is composed of a fibrine-like substance, but not true fibrine. The basal membrane is a light-colored, granular mass, which does not stain easily, even with Weigert's method. In this mass there are a number of larger granules of irregular outline and which take on the stain more easily; they are presumably old cells and resemble connective-tissue elements. There are no vessels. In one of the specimens, cells with vesicular nuclei could be indistinctly seen, also numerous well-stained leucocytes. This membrane hardly seems to be necrotic tissue; it is much more likely to be an excretory product. Schmauss and Albrecht[1] have shown in their article on the caseous

[1] *Virchow's Archiv*, cxliv., 1896.

necrosis of tubercular tissue that there is a primary stage in the caseation of the tubercle, where a tissue similar to the one above described is found. This substance resembles fibrine but does not stain by Weigert's reaction. Hence these authors have named it fibrinoid, and think that the process may stop at this point, persist, or change to hyaline.

FURTHER CONTRIBUTION TO THE PATHOLOGY OF INTRACRANIAL COMPLICATIONS OF EAR AFFECTIONS.

By Dr. W. KÜMMEL, Breslau.

Translated by Dr. Adolph O. Pfingst, M.D., Louisville, Ky.

IT is my purpose in this communication to add some recent observations to my previous report of otitic brain affections (these ARCHIVES, vol. xxvi., No. 4). In two of the cases which I shall report the presence of a brain abscess was diagnosticated and the pus evacuated, not early enough, however, to prevent a lethal termination.

In another case an extensive intracranial involvement was entirely overlooked.

Case 3.—**Otitis media of long standing with perforating necrosis of the tegmen tympani and abscess of the temporal lobe. Evacuation of the abscess. Death from meningitis.**

L. R., thirty years old, farmer, has had a discharge from the right ear and defective hearing on that side as long as he can remember. The discharge had at intervals become more profuse and along with the increased flow had taken on an offensive odor. While in this state the patient had suffered from pains in his head, which always left him when the discharge again became diminished. He has never felt any dizziness.

Eight days ago after a longer period of quiescence than usual the otorrhœa again increased and took on a foul odor. His headache was more severe than at previous attacks. He consulted me August 1st. His physician informed me that for several days there had been an irregular rise of temperature (maximum 103.2° F.), frequent vomiting, constipation, and finally diarrhœa. When I saw him, his temperature was 101.4°, pulse 74. He was

in a state of high mental excitability, his headache so intense that he continuously entreated me to administer chloroform. In walking, he would drag his feet in a sluggish manner and would step upon the entire sole. When he sat down, he did so very slowly and cautiously. There was no tendency to fall, but to sway slightly from one side to the other, which was not increased on closing the eyes. A slight tremor of the hands was noticeable, but all the other functions, including those of the face and eyes, were undisturbed.

Examination of the left ear revealed nothing abnormal. The right external auditory canal was filled with fetid pus, and when cleansed of this showed a mass of grayish-red granulation tissue occupying its entire lumen. The polypus was hanging down at a pedicle from above and anteriorly, emanating, evidently, from the attic. Owing to the hypersensitive condition of the patient efforts at its removal proved futile.

The history of this case—headache, vomiting, and irregular rise of temperature—and the presence of intense headache, marked physical derangement, and alteration of the gait of the individual, indicated almost beyond a doubt the existence of some intracranial inflammatory process. In arriving at a diagnosis, the existence of a thrombus of the lateral sinus could reasonably be excluded in view of the absence of all objective signs of this condition and of the typical pyæmic temperature. Furthermore, notwithstanding the long continuance of the ear affection, metastatic inflammatory foci had nowhere developed. The exclusion of thrombosis left for differentiation meningitis, extradural abscess, and abscess in the brain substance, either of the cerebrum or cerebellum.

There was no spasmodic contraction of the posterior cervical muscles, nor derangement of the ocular or facial muscles to denote meningitis, while the entire preservation of equilibrium favored the non-existence of a cerebellar abscess. The history of increased headache with increase in the discharge of pus from the ear, along with the absence of characteristic symptoms of cerebral destruction, rather indicated epidural abscess which at intervals discharged its contents spontaneously through the tympanic cavity. From the absence of tenderness over the mastoid process and

marked sensitiveness over the squamous portion of the temporal bone I inferred that the primary disease was located in the attic, and that the possible situation of the epidural abscess was above the tegmen tympani. The location of the primary disease in the attic was also suggested by the mass of granulation tissue seen projecting from it into the external auditory canal. The continuance of the symptoms on the following day, with a temperature of only 100.2° and pulse of 74, was conclusive evidence of compression of the brain, and influenced me to operate with a view of finding and relieving the cause. I proposed to open the antrum and to proceed thence, as indicated by the conditions found, into the middle cranial fossa, or the temporal lobe, or to expose the lateral sinus.

The operation was performed as follows: After exposing the mastoid by making the customary semicircular section, the cells were opened with a chisel until the lateral sinus was laid bare without finding pus. The middle cranial fossa was then opened by extending the operation upwards. The exposed dura appeared normal and did not pulsate. No pus was found. An exploratory puncture with a needle extending through the dura and upward into the brain substance revealed a pus cavity not far from the surface. The dura was divided by a sagittal section, and a scalpel, plunged into the cavity, allowed a large quantity of foul pus to escape. A drainage tube was then inserted to the depth of about 4 *cm* and a bandage applied. The temperature on that evening rose to 101.4°, pulse 72. The wound discharged so freely that the dressing was soaked.

Aug. 3d (following day).—At noon, temperature 104°. The face and extremities of ths left side were paralyzed. The patient was somewhat depressed. By night he was more cheerful, and the temperature had fallen to 100.4°. He continued to improve up to August 5th, taking liquid nourishment and showing no unfavorable symptoms. On that night there was a slight but sudden rise in temperature to 100.7°, and a reduction of the pulse beat to 64.

Aug. 6th.—Temperature 101.6°, pulse 58. Patient was fed with a stomach tube. Fearing that other parts were involved, I exposed a larger surface of the sinus, removing the bone with Luer's forceps, but found it healthy. An exploratory puncture was also

made into the cerebellum with a negative result. A diagnosis of meningitis was now made.

On the afternoon of August 7th the temperature rapidly rose to 104°, pulse to 166. Stupor increased, the heart becoming weaker until death took place.

At the **Autopsy,** held on the following day, it was found that brain substance had filled the opening in the right temporal bone. The Pacchionian bodies of the right side were much more numerous than on the left. The gyri of the right cerebral hemisphere were flatter than those of the opposite side, while the sulci were partly obliterated. The pia of this side was dry and contained a large hemorrhagic infiltration extending over the frontal and temporal regions, and over the fissure of Sylvius to the base of the middle cerebral lobe. The dura around the wound corresponding to the opening behind the ear was infiltrated and had a greenish-yellow hue. Over the tegmen tympani it carried a small, reddish-black, teat-like mass, which projected into the tympanum through an opening in the bone about the size of a pin-head. The bone around the opening was also discolored yellow. The lateral sinus appeared normal. On dissecting the cerebrum, the abscess cavity of the temporal lobe could be distinctly outlined. It now appeared as an irregular cavity narrowed above by the projecting brain substance. The surrounding brain tissue was infiltrated and soft, the degeneration extending to a less degree into the corpus striatum. Its intraventricular portion seemed almost obliterated, while the portion external to the ventricle was much enlarged. The ventricles were all distended and tensely filled with coagulated blood. From the posterior cornu of the lateral ventricle a canal was found running upwards and forwards and joining it with the abscess cavity. Its lumen had a diameter of about 8 *mm*, and contained fresh coagula. The surrounding brain substance was softened.

At the base of the brain the pia mater was opaque, and over the optic chiasm and just behind it contained purulent and gelatinous deposits. Infiltration of pus could be traced in the pia as far back as the cerebellum.

Sections of the right temporal bone through the tympanum showed this cavity to be filled with thick, fetid pus. Upon removing this a small grayish-black polypus was exposed, hanging from above, and entirely occluding a hole in the drum-membrane. It was found to spring from the lower end of what remained of the

malleus (just below the processus brevis). The tendon of the tensor tympani was intact. The attic was entirely filled with granulation tissue which imbedded within it the body of the malleus and the incus. Nearly the entire tegmen was necrotic, the sequestrum extending to the upper border of the petrous bone. Its rough line of demarcation left two small defects anteriorly between the diseased and healthy bone, creating a free communication between the tympanic and cranial cavities. Into the largest of these ($1\frac{1}{2}$ *mm*) the teat of granulation previously mentioned was projecting from the dura.

The vestibule and cochlea appeared normal.

This case furnishes a typical instance of extension of disease of the ear to the brain through the tegmen tympani. A small extradural abscess, which was no doubt an intermediary process, had on account of its minute size and its median position been overlooked. The course of the extension into the brain substance could not be traced, owing largely to the distortion occasioned by the prolapse of brain substance.

While it is probable that the operation was performed too late, *i. e.*, after infection of the meninges had occurred, this cannot be positively asserted, as there was ample time after the operation for changes such as the autopsy revealed to have taken place. The meningeal space could have become infected during the operation by a dissemination of infectious particles from the concussion of chiselling.

Infection of the arachnoid by its contact with the necrotic dura and an extension by gravity to the posterior cranial fossa is, in consideration of the predominance of the meningitis in that region, also a reasonable theory. Another possible avenue by which the inflammation could have spread to the meninges is the canal referred to connecting the abscess cavity with the posterior cornu of the lateral ventricle. Supposing this to have been the course of the process, the extension was evidently slow, the evacuation of the pus cavity having prevented more rapid and severe symptoms. Involvement of the meninges could possibly have followed the degeneration of the brain substance which took place around the abscess cavity.

CASE 4.—**Chronic suppurative otitis media. Cessation of the process. Infection of some of the mastoid cells, extension to the cranial fossa through the hiatus subarcuatus. Large extradural abscess and abscess of the temporal lobe. Evacuation of both. Death from pneumonia.**

D. O., thirty-six years old, travelling man, when admitted to the clinic November 2d, was in a stupor and to all appearances severely ill. The history of the patient, elicited from his wife, showed that he had been a frequent sufferer from otorrhœa on the left side and that on divers occasions paracentesis of the drum had been made. Otherwise little attention had been paid to the trouble.

Three weeks ago the patient was suddenly taken with severe headache and fever, and there appeared behind the left ear a painful swelling, which has since gradually increased in size. No pus came from the ear. The patient did not visit the clinic until driven to it by the intolerable pain, and until he was scarcely able to stand or walk alone. He had to be supported by a companion. His gait was laborious, and he dragged his feet in walking. Unsupported, his knees would give way from under him. There was no tendency to fall in any one direction.

The skin behind the left ear was reddened and tensely swollen, but not fluctuating. The swelling extended upward over a considerable area of the squamous bone and down beyond the limits of the mastoid process. The walls of the ear canal were swollen; the drum-membrane reddened, but not bulging. No discharge followed paracentesis of the drum. Temperature 103.1°; pulse 96. Examination of the fundus of the eye and functional examination of the ear were not made. The muscles of the eyes and face showed no disorder. There was no opisthotonus.

It seemed apparent, from the severity of the symptoms, that, besides the mastoiditis and the invasion of the external soft parts with pus, we had to deal with some intracranial complication, the nature of which could, for want of definite symptoms, not be determined. From the slow pulse and the absence of muscular rigidity, meningitis could, with a reasonable amount of certainty, be excluded. There was nothing characteristic to indicate a sinus thrombosis. Which of the other possible conditions might be present was left for the operation to determine. The patient was operated upon by Dr. Tietze soon after being admitted to the hospital. On making the section through the soft parts behind the ear, a quantity of pus was evacuated, and on removing the

periosteum from the bone, it could be seen oozing freely at three points from the mastoid. One of these points corresponded to the mastoid foramen, the other was more anterior at the base of the process, while the third was situated above the temporal ridge. Upon opening the bone with a chisel, the pneumatic spaces were found full of pus. They were removed with the chisel as thoroughly as possible, also the bone in a backward direction until the posterior cranial fossa behind the lateral sinus was exposed. An area of bone 5–6 *cm*, forming part of the floor and lateral wall of the middle cranial fossa, was also removed. The space between the openings into the skull represented the extent of the extradural accumulation of pus. A canal of communication between this abscess and the mastoid cells could not be found. The exposed dura over the cerebellum was very tense, and over the temporal lobe was distinctly pulsating. Several exploratory punctures into the cerebellum through the disinfected dura failed to bring pus, while the first puncture of the temporal lobe entered an abcess cavity at about 4–5 *cm* from the surface. The needle was left in place, and after a vertical section of the dura, the cavity was opened with a scalpel by following the needle. Two tablespoonfuls of foul pus were removed, a drainage tube was then inserted, a tampon of iodoform gauze applied around it to check the bleeding from the vessels of the pia mater, and the bandage applied.

Nov. 3d.—The patient passed a restless night on account of headache. His mind seemed clearer in the morning, but the stupor gradually increased toward evening. In changing the dressing at that time, the drainage tube was found choked and was replaced by a new one. The morning temperature was 103.1°; pulse 96. The evening temperature 102.4°; pulse 112. The fundus of the eye was examined and found normal.

Nov. 4th.—The patient was extremely restless during the night, singing and screaming alternately. Toward morning he began belching. During the day he passed into a stupor, and toward evening vomited twice. On dressing the wound at night, additional punctures were made into the cerebrum and cerebellum without finding more pus. Broken-down brain tissue was coming away from the wound.

Nov. 5th.—The dressing was found saturated. The patient passed into a state of unconsciousness, being unable to swallow, and to void his urine. Temperature 99.2–100°; pulse 76–92. During the night he passed into a comatose condition.

Nov. 6th.—There was profuse diaphoresis, a rise in temperature, an increase in frequency of the pulse and respiration, and persistent eructation. Coma had become more pronounced.

Temperature 99.5°; 100.9°; 103.1°.

Pulse 120; 126; 156.

Respiration 26; 32; 54.

Nutrition was supplied artificially.

Nov. 7th.—Temperature 105.2°; pulse 156; respiration 64. Yesterday and to-day crepitant rales were heard over a large area of the lungs. No dulness on percussion.

Exitus letalis at noon.

Autopsy.—Outside of a marked fatty degeneration of the heart, there were no changes of the internal organs that would have a bearing on the case. The left tibia was thickened, evidently an old osteomyelitis. The wounds of the temporal bone made at the time of the operation contained prolapsed bloody purulent, softened brain tissue. On removing the calvarium, the dura was found tense. The longitudinal sinus contained a blood clot. At the base of the brain, particularly around the pons and medulla, the parts were obscured by a grumous mass situated in the pia mater and arachnoid. At the posterior inferior part of the temporal lobe, the drainage tube was found leading to a dirty, yellowish-red, softened mass. The discolored area was wedge-shaped, its apex being directed towards the dilated posterior cornu of the lateral ventricle. The tube seemed to be lodged in the cornu. The bone in the region of the tegmen tympani was marked by several translucent areas, which, upon removal of the dura, were found to be breaches in the bone covered over with a thin membrane. Corresponding to the highest portion of the tegmen (eminentia arcuata), near the upper border of petrous bone, an area was found as large as a pea, which was discolored yellowish white and perforated by a large number of minute canals filled with pus. The dura had been removed from over this area at the autopsy, so that its condition could not be ascertained. The mastoid antrum contained no pus, although some was found in a number of remaining pneumatic cells. The drum-membrane was intact; the tympanic cavity normal. The vestibule, semicircular canals, and the cochlea were filled with a gelatinous, almost transparent mass. The finely perforated area of bone previously mentioned extended to within close proximity of a recess of the antrum, which projected upwards between the

superior and the horizontal semicircular canals. The lamina of bone separating it from the antrum was yellow, and was subsequently found by microscopic examination to be inflated with round cells. The elongated recess, as well as the rest of the antrum, was lined with delicate granulation tissue. Microscopic sections also showed a band of connective tissue, 1 *mm* wide, extending from the granulation tissue of the antrum, between the superior and the horizontal semicircular canal, to the previously described perforated area near the upper margin of the petrous bone. The tissue was infiltrated with small round cells. The surrounding bone, especially in a backward direction towards the internal auditory canal, was likewise infiltrated, and, judging from its reluctancy to take on stain, was undergoing necrosis. The semicircular canals were filled with loose connective tissue. No trace of the normal membranous semicircular remained.

The thought of an extension to the brain from the labyrinth at once suggested itself in this case on account of the abnormal contents of the labyrinth. A thorough microscopic study of the pathological changes persuaded me that the necrotic, infiltrated area near the superior semicircular canal was of more importance than was at first apparent. Waggenhauser (*Archiv für Ohrenheilk.*, Bd. xix., p. 95), v. Troeltsch, and others, after a close study of the process of dura mater, which in fœtal life enters a large opening in the petrous bone (fossa arcuata) to terminate in the cells under the superior semicircular canal, and of its disposition in after life, called attention to the possibility of cerebral infection taking place along this channel. A number of cases demonstrating this mode of extension have since been published by v. Troeltsch, Voltolini, Hartmann, and others. The band of connective tissue, described in our case, passing through the bone, corresponded in situation to the process of dura of fœtal life, so that the inference of an extension of the inflammatory process along its vessels from the middle ear to the labyrinth, and, simultaneously or subsequently, to the cranial cavity, would be justifiable. The inflammation, while terminating in resolution, left a band of connective tissue. A recurrence of the inflammation in this area at intervals probably rekindled the

trouble in the ear, so that, outside of the first attack, the otitis occurred secondarily to inflammation of surrounding parts. While we have no reliable history of our case to aid us in determining the cause of the primary ear trouble, I am inclined to believe that the affection dates back to the early years of the patient, and to associate it with the osteomyelitis of the tibia, which had existed for thirteen years. Along with the osteomyelitis of the tibia, the existence of a similar affection of the eminentia arcuata and of the bone surrounding the process of dura referred to is possible.

Little or nothing has been written about genuine osteomyelitis of the petrous bone. In the single case reported (Steinbrügge, in Orth's *Lehrbuch der speciellen pathologischen Anatomie*, 1891, p. 116) the author was not positive in the diagnosis. However, the history in Steinbrügge's case, as well as in the case just described, would suggest a secondary affection of the ear from diseased portions of the petrous bone. The view is strengthened by the frequent recurrence of the apparently healed process at the least provocation, such as a slight traumatism or cold. The case may at least serve as an incentive to search for osteomyelitis of the bone in fatal cases of brain complication of otitis.

Our case also presents some interesting features from a diagnostic standpoint. The discovery of an extradural abscess of such proportions, and the evacuation, would ordinarily have satisfied the operator, especially so as the dura presented a healthy appearance. The exceptionally tense condition of the dura prompted me in exploring the deeper parts in this case. After making an unsuccessful exploration of the cerebellum, to which I was led by the absence of pulsation of the dura over that part, I continued the search for pus, the marked internal pressure as evidenced by the tense dura convincing me of the presence of an abscess within the brain substance. Aspiration of the temporosphenoidal lobe through the pulsating dura verified the diagnosis.

The cause of death in our patient was undoubtedly the broncho-pneumonia superinduced by a debilitated state of the body. The infection of the lung may have been the

result of a general septic condition originating in the abscess or of the aspiration of particles of food into the lung.

CASE 5.—**Chronic purulent otitis media with cholesteatoma. Latent brain abscess with meningitis and sinus phlebitis—Diagnosis not made. Sudden death without operation.**

R. W., a boy, twelve years of age, with a good personal and family history, has an otorrhœa which began one and a half years ago without pain or any other symptom. It seems that the discharge gradually became more profuse, but the boy was not seen by a physician until a short time ago. Finding an aural polypus in the right ear-canal and frequent headache with an irregular rise in the temperature, the attending physician suspected an intracranial complication, and referred the case to our clinic. When I examined the patient on August 6th, his left ear was, outside of a retracted drum, found to be normal. The right ear-canal was filled with thick pus, which had but a slight odor. It was removed by irrigation and a mass of granulation tissue exposed in the upper anterior part of the canal, hiding the drum-membrane. Pus was exuding from behind it. As much of the mass was removed as was possible with the snare and curette. The function at this time for voice = o, while the tuning-forks could barely be heard through the bone. There was no symptom of facial paralysis and no disturbance of speech or locomotion. The fundus of the eye was normal. No headache. Temperature 98.6°, pulse 72. Pressure over the mastoid and squamous bones elicited some tenderness. As the boy was bright and apparently not seriously affected, it was decided to watch the case for a while.

August 7th.—Irrigation of the attic brought little pus. Points of remaining granulation tissue were cauterized with chromic acid, and boric acid was insufflated. Temperature 98–99.1°, pulse 64–68.

August 8th.—No change in the general condition. The right ear was discharging pus freely. Soon after eating his evening meal the patient vomited, but afterwards felt comfortable. The fundus of the eye was still unchanged. We thought we were able to recognize a slight facial paresis, although this was questionable. Temperature 97.8–99.1°, pulse 64–72. During the night the patient vomited once and complained of severe headache. At 5 o'clock of the next morning his temperature was

100.7°. He again vomited, and not long afterwards passed into a state of unconsciousness in which he died at 6.45 A.M.

At the post-mortem examination made on the following day the right cerebral hemisphere was found to be 1½ times as large as the left. Upon incising the dura over the right ear several drops of pus escaped. The convolutions of the brain were more or less flattened on this side; the brain, outside of a softened, discolored, reddish-black area over the petrous bone, otherwise normal. This dark disintegrated area extended to within a few centimetres of the apex of the petrous bone. Over the tegmen tympani the dura and pia mater were adherent, a fibro-purulent deposit having formed between them. In making a transverse section of the right cerebral hemisphere, about 5 *cm* behind the apex of the temporal lobe, a large abscess cavity filled with yellowish-green pus was opened.

The walls of the cavity, which was about the size of an orange, were disintegrated and soft, and were speckled with small black areas. The brain substance around this well-defined capsule was softer than usual, especially in a backward direction. The ventricles of the brain were displaced, but in no way communicated with the abscess cavity.

The temporal bone, which had been sawed through the long axis of its petrous portion, was discolored grayish green over the tympanum from close to the eminentia arcuata to near the facial canal. The tympanic cavity was filled with granulation tissue which had perforated the drum-membrane at the upper and posterior portion, leaving but a small rim below and anteriorly. The manubrium and the long process of the incus were missing. The portions of the bones which remained intact were firmly imbedded in the granulation tissue. Above the bones, in the vault of the attic, a large, shining cholesteatomatous mass was found, separated from the hole in the drum by granulation tissue.

The white stratified mass extended into the mastoid antrum, in whose upper portion it was infiltrated with bright yellow pus. Posteriorly the enlarged antrum was separated from the sigmoid sinus by a very thin, dark red, porous lamella of bone. Both the cochlea and vestibule contained dried pus. The contents of the lateral sinus were also purulent, the abscess being limited at each end by a delicate thrombus.

We have in this case an instance of pus breaking into the cranial cavity from the ear by two separate and distinct

perforations of the bone, the one of the tegmen tympani admitting infection to the middle cranial fossa, the other of the mastoid wall giving access to the posterior fossa. The origin of the trouble seems to have been in the cholesteatomatous mass found in the attic, as it contained pus only in the small portion extending into the mastoid cells. However, the possibility of an external origin of the cholesteatoma with encroachment on the attic could not be excluded,

The failure to make a diagnosis in this case was deplorable. inasmuch as the age of the individual and his otherwise normal condition would have given him some chance of recovery, notwithstanding the magnitude of the cerebral abscess and the presence of encapsulated pus in the sinus. If only the mastoid operation had been undertaken it would undoubtedly have led to the discovery and relief of the other conditions.

The most remarkable feature of the case to me was the complete absence of symptoms with such extensive changes going on.

I have been unable to find a parallel case in literature. The only point which might have suggested complication of the ear trouble (of sinus phlebitis) was the irregular rise in temperature noted by the family physician.

ON RADICAL TYMPANO-MASTOID OPERATIONS.[1]

By HERMAN KNAPP, New York.

Mr. President and Gentlemen:

AMONG the surgical procedures cultivated so successfully by otologists during the last decades, the most important, but also the most difficult, is the so-called radical mastoid operation. It is called radical in contradistinction to the typical opening of the mastoid according to Schwartze. The radical operation, as it is now practised by Küster, Zaufal, Stacke, Schwartze, Jansen, and every active ear surgeon, means the free exposure and thorough removal, *à plein ciel*, of all diseased parts in the mastoid, tympanum, attic, and the numerous pneumatic cavities surrounding the ear. All these spaces are in connection with the auditory organ in the same manner as the air cavities of the face are in connection with the nose. Also the diseases of the one set are duplicated by those of the other. The excellent pioneer work in the treatment of mastoid disease done by Tröltsch, Schwartze, and others has been universally appreciated, but a new impetus was given to aural surgeons when Küster, of Berlin, in 1889, censured them for doing their work in the dark. He dwelt upon the necessity of free exposure of all the cavities of the middle ear during the operation and during the after treatment. The principle was so clear that it was at once generally adopted. Foremost in its application were Zaufal and Stacke, who simul-

[1] Read before the meeting of the Western Ophthalmological and Oto-Laryngological Society in Chicago, April 7, 1898. The discourse was illustrated by blackboard drawings, and followed by the demonstration of anatomical specimens.

taneously devised radical operations. At first their methods differed somewhat, but now, by the force of facts, they have become virtually identical. The problem is to lay bare and eradicate the morbid process from its origin to the remotest nooks and corners. Zaufal began his operation by penetrating into the antrum through the outer table of the mastoid, thence he proceeded through the aditus ad antrum into the attic, whereas Stacke went from the attic through the aditus into the antrum. Zaufal thinks his way is the easier, whereas Stacke contends that his is safer. Stacke says that he is sure not to injure the facial nerve or any other important part, when he passes a probe from the tympanum through the aditus, and chisels away the bone over the probe. When he has the aditus sufficiently widened, he opens the antrum from behind the ear-canal, chisels away the posterior wall of the latter, removes the anterior wall of the attic, and cleans out all these spaces just as Zaufal does. At the beginning, Stacke began the operation with detaching the cutis all around the ear-canal, and pulled it out, so as to gain a clearer view into the depth of the canal. At the end of the operation, he put the integument back into its place. Zaufal, and later also Stacke, began the operation with detaching the integument only from the posterior, upper, and, if necessary, part of the lower wall, and held it with a knee-bent retractor pressed against the anterior-lower wall. This has proved sufficient for almost all purposes.

Gentlemen, the operation is quite difficult and long. It is neither possible nor proper for me to describe it here in its many details; all I shall tax your patience and indulgence with is to make some remarks on the technique of the more difficult steps and the importance of this operation.

First, I desire to premise that so extensive an operation should not be done if a simpler one, viz., the opening of the mastoid alone, would be sufficient, as in the great majority of cases of *acute mastoid empyema.* On the other hand, there are many cases in which even the most radical tympano-mastoid operation is not extensive enough to cure the patient, namely, in the intracranial complications of purulent middle-ear disease. Yet, for the cure of these complications,

the radical operation is the indispensable initial step, just as it is the best prophylaxis of their occurrence.

As to the technique, I want to point out, above all, how to avoid the **chief danger** in this operation, the **injury to the facial nerve.** In mastoid operations we have, as a rule, first to expose the antrum, the starting-point for all further steps. The most natural way to enter the attic is from the mastoid through the aditus ad antrum. The latter being situated in the prolongation of the horizontal process of the incus and in the medial wall of the tympanic cavity, we can easily ascertain whether the bottom of the hole we have dug into the antrum has reached this plane or not, if we first introduce a probe through the ear-canal down to the bottom, and compare the depth of its penetration with that of the artificial hole in the mastoid. As long as the latter is less than the former, we may confidently chisel on, deepening the cavity, and removing the posterior osseous wall at the same time. In doing this we should always bear in mind that the facial nerve passes from the medial wall of the antro-tympanic canal not directly downward, but downward and somewhat outward, to the styloid foramen, which is situated near the anterior end of the mastoid groove.

In ordinary cases, after fully exposing the outer surface of the mastoid from the tip to about 1 *cm* beyond the upper wall of the external meatus, and denuding the upper and posterior bony wall, we proceed directly toward the antrum, by chiselling away the bone from above downward and from below upward in thin layers (Zaufal chisels in a horizontal direction), deeper and deeper, but all the time having the surface clear in view by carefully removing chips, blood, pus, granulations, or other tissue, examining with the eye and probe not only what we have before us but also what the condition of the successive strata is. When we have reached the antrum, we introduce a bent probe up and forward into the aditus, and over it or over a broader-bent probe—Stacke's protector (Schützer)—chisel the posterior wall of the bony meatus-wall away. While doing this down to the hard ridge which encloses the facial from the aditus to the styloid foramen, we have the face of the patient watched for twitchings, indicating interference with the nerve.

In case it is difficult to find the aditus by way of the antrum, we seek it by way of the tympanic cavity. Stacke, in his recent monograph[1] (which, though colloquial and verbose in style and controversial in character, is in a high degree impressive, attractive, and instructive), states that he prefers to begin the radical operation in the middle ear, because in this way he is always sure readily to find the antrum. Zaufal[2] and Schwartze and his assistants[3] do the same when they fail to find the antrum and the aditus from the side of the mastoid. I have in some cases, where I could not introduce the probe freely into the aditus from the side of the antrum, passed another from the attic up and backward to meet the first. In this way I could ascertain not only the position but also the curve and length of the antro-tympanic canal.

Another danger inherent in the radical operation is the **injury to the horizontal semicircular canal.** This canal is surrounded by a dense bony wall, which, during the operation, presents itself as a shuttle-shaped white, compact mass, slightly curved, with the convexity upward, and resting on the upper-posterior part of the Fallopian canal. Its upper end is part of the posterior wall of the antrum canal, on a level with the Fallopian canal. During the operation, it is protected by the single or double probe. If we are careful, having good light and the surface free from blood, it is easily recognizable—in fact, a very conspicuous landmark in this region, and not so liable to be injured as the facial nerve.

The most difficult but also the most important part, in my estimation, is the **clean removal of the lateral** (anterior) **wall of the tympanic vault** (the attic), which passes from the antral canal to the tympanic orifice of the Eustachian tube, hiding the upper parts of the mallet and anvil. It can be removed with a chisel either through the meatus or side-

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[1] "The Operative Exposure of the Middle-Ear Cavities, after Detachment of the Auricle: a Radical Operation to Cure Inveterate Otorrhœa, Caries, Necrosis, and the Cholesteatomata of the Temporal Bone, with the Histories of 100 Cases." Tübingen, 1897 (in German).

[2] Zaufal, "Zur Geschichte u. Technik der operativen Freilegung der Mittelohrräume." *Arch. f. Ohrenhk.*, Bd. xxxvii., S. 33, etc., 1894.

[3] Grunert, "Beitrag zur operativen Freilegung der Mittelohrräume." *Arch. f. Ohrenhk.*, Bd. xx., S. 237, 1896.

ways through the antrum, but also with an appropriate rongeur-forceps (Zaufal, Hartmann, and others). I am accustomed to do it with a chisel from the side of the antrum, being careful lest the ossicles fall into the mouth of the Eustachian tube.

The main object in this, as in all other steps of the radical operation, is cleanly to remove all diseased bone and necrosed or heterogeneous substances, in particular the inspissated masses of secretion and necrobiosis, and the various epidermoid formations described under the comprehensive name of cholesteatoma. The latter, by the way, do not seem to be so frequently met with in America as in Europe, perhaps because we have not been so accustomed to look for them as our longer-trained colleagues on the other side of the Atlantic.

All this dead and decaying tissue is apt to cause and propagate the well-known deleterious processes of suppuration, caseation, necrosis, epidermization, thrombosis, pyæmia, meningitis, etc. With this object in view, we have to expose clearly and inspect attentively, by bright daylight or electric light, the surfaces which separate the ear cavities from the cranial fossæ. If these surfaces are discolored or corroded, they should be removed as far as they are diseased, and even if they appear healthy, but fever and other symptoms point toward the presence of an otogenous difficulty we should make an **exploratory opening** into the middle or posterior cranial fossa, or both. As it is not easy to discriminate between a meningitic irritation and a beginning meningitis, we may, in a given case, stop after a thorough mastoid operation, but must watch the patient carefully, and extend the operative interference if the cerebral symptoms do not abate in the next few days.

In reviewing the results of my operations, I scarcely ever have found cause to blame myself for doing too much, but frequently for not going far enough, or doing what was right, too late.

Will you, Mr. President and Gentlemen, now allow me to conclude my remarks by relating, in abstract, a few cases selected from my recent practice.

CASE I.—Mr. W. Moldauer, a strong man of thirty-six, came to me November 8, 1897, with otorrhœa in left ear, dating from childhood. Has been treated in Vienna. Suffered fifteen years from repeated attacks of pain in L. mastoid, and on the side and back of his head, more in winter time. Pain relieved when ear discharged. Large perforation of lower part of *Mt*, the upper and posterior thickened and red. Tip of hammer visible. L $h = \frac{c}{24}$; V = $\frac{20}{60}$. R $v = \frac{20}{20}$. Tenderness over mastoid.

Dec. 10, 1897.—*Radical operation;* posterior and upper part of soft wall of ear-canal detached; the bone wall chiselled away; lateral wall of attic and ossicles, partially carious, removed; the tip of mastoid chiselled open; no pus found but congested mucosa and soft diploic bone. Skin of canal horizontally split, pressed against posterior wall of wound by packing ear-canal with sterilized gauze.

Fever, temp. up to 102° F., and redness, swelling, and painfulness of the skin, neck, and adjacent part of chest on left side; all disappearing in five days. Discharged from hospital in two weeks, feeling comfortable. Discharge from ear greatly diminished. He came to see me three times, had pain and some dizziness, which disappeared after scraping out granulations from posterior end of ear-canal and medial surface of tympanum. He came to me twice more, feeling well, strong, and cheerful.

As I did not see him for two months, I wrote him a note asking how he was doing. I received the subjoined answer:

"NEW YORK, April 3, 1898.

"SIR,—We received your letter, and we are very sorry to state that your patient will never come to see you again. It is just eight weeks to-day that Mr. Moldauer died. He made a visit to your hospital on February the 2d and attended to his business afterwards. In the afternoon of Feb. 3d he complained of a great pain in his head, and he went up to his house to take a rest. In the morning of Feb. 4th he felt a little better, so he dressed himself to make you a visit. He only reached as far as the street when he felt a dizziness in his head. He had to be assisted back to the house and we laid him in bed, and before we had time to ask him how he felt, his head died, and in a few hours afterwards his body died after a terrible struggle, and this is why he could not come to see you again.

"M. MANDEL, 43 Bayard Street."

This patient suffered from chronic otorrhœa, which must have had another source than the tympanic cavity. He probably had an abscess in the temporo-sphenoidal lobe, which discharged through the roof of the attic during occasional aggravations of inflammation. Rapid death by perforation of the abscess into the third ventricle or into the subarachnoid cavity. After the operation he gradually improved, and when I last saw him he was so cheerful and free from all discomfort that I did not suspect a grave complication.

CASE 2.—Mrs. E. P., twenty-five years, came first in September, 1893, having had otorrhœa R. eight years. *V:* R $\frac{10}{60}$, L $\frac{20}{20}$. Headache, nausea, offensive discharge, drum-walls swollen, covered with white material; attic caries. Paracentesis, attic scraped, granulations removed. Symptoms temporarily relieved. Later, under cocaine, attic scraped in every direction. Anvil and head of hammer carious. Removal advised. Feels better. Headache, foul-smelling discharge, dizziness, nipple-shaped perforation in Shrapnell's membrane, rough bone and at times polypi scraped and removed. Syringed with tympanic syringe.

Oct. 6th.—Fistula in attic enlarged by incision. Part of *carious incus removed.* No malleus found. The carious walls of attic scraped. No reaction. After-treatment: wiping out of attic, and injections with tympanic syringe. Discharge scant, but offensive. Feels better, but at times has had severe attacks of headache, nausea, vomiting, and especially dizziness. Discharge offensive, purulent; feels free from head symptoms. She was treated persistently with the tympanic syringe, nitrate of silver, alcohol, under varying improvements and aggravations. The odor of the discharge did not disappear, and there were the occasional attacks of occipital headache and dizziness, giving warning. Therefore, a *radical operation* was performed Oct. 26, 1897.

The mastoid antrum and tympanic attic were thoroughly curetted, no fistula or necrosed bone found on roof of attic. The lateral wall of attic was removed. The ossicles were absent. When the patient came to after the etherization her mouth was crooked and she could not close her right eye (*facial paralysis*). No twitches of the face had been observed during the operation. There was headache, dizziness, nausea, and occasional vomiting for several days. Temp. normal, pulse slow (64). Wound and auditory canal

packed with gauze. Some swelling around wound, and a great deal of offensive discharge. These symptoms disappeared in six days.

From now on the patient made a slow but regular recovery. The facial paralysis disappeared in three months, the discharge grew scanter and has lost its odor almost completely ; two or three times after the operation I had to scrape off granulations from the upper-posterior corner ; she has had a few spells of headache and dizziness, but they were light and transient. In the attic region there is no smelling, no cheesy or scaly deposit any more, but slight granulations are there still : the tympanum is in a fair way of epidermization. The patient is in good health and cheerful.

This is the first time in all my operative practice that a case of paralysis of the facial occurred. It vexed me greatly because I consider it an avoidable accident, if proper care be employed. I was out of my guard after the posterior wall had been removed and the antrum and attic exposed in the manner described above. The wounding of the nerve must have occurred during the curetting, which, on account of the obstinacy of the case, and the long and inefficient treatment, I did quite thoroughly. In other cases I had noticed twitching of the face but no paralysis.

The wounding can have been partial only, for the paralysis was not complete and has entirely disappeared, which is alleged to be less common when the paralysis occurs during the operation than some days later.

Case 3. Mrs. E. Gerth, aet. fifty, New York. Has had otorrhœa since childhood. When she was small, Prof. Bruns of Tübingen made a paracentesis of the left membr. tymp. for an abscess of the middle ear. Ear has discharged off and on ever since, but not copiously, and the hearing in it was poor. In 1893 she came to me for treatment. There being attic trouble (offensive discharge, flaky deposit in upper part of drum—cholesteatoma), I removed the anvil, the hammer having been destroyed by the suppuration. The patient was relieved, not cured. In January, 1898, she came again, complaining of intense pain in the ear and head. The discharge was moderate, but very offensive. The attic when probed, showed roughness of the walls.

Febr. 12, 1898. *Regular radical mastoid operation*, the tympanic

cavity, attic, and mastoid antrum converted into one cavity, the walls of which, especially those of the attic, were thoroughly scraped.

The recovery, thus far, has been smooth. The cavity in mastoid and ear were packed with gauze at first, in a week the upper part of the mastoid opening was sutured, the lower left open and kept open by a perforated silver tube. Water syringed into the ear escaped freely through the mastoid opening, which is now (April 1, 1898), almost closed. No granulation tissue in middle ear, apparently. Cutization from below. No discomfort in head or anywhere. "Feels like another person."

This is one of those cases—what the approximate percentage is I know not—in which the suppuration with more or less distress continues a lifetime. The patients do not die, but the disease is never cured. This probably depends on the more or less favorable conditions for free exit of the discharge.

The three cases here briefly detailed testify to the truth of the saying of Sir Wm. Wilde: "If an ear once discharges we never can tell what will be the end of it." In Case 1, it was death; in Case 2, apparent, but not yet certain, recovery; in Case 3, perfect recovery, as far as we can tell so short a time after the operation.

Case 4.—Flossie Heissenbüttel, æt. three, offers an example of middle-ear disease in its progress to the sigmoid sinus, which was stopped and a cure effected by a radical operation. It was a case of *caries and necrosis of the mastoid with perisinuitis, checked and cured by operation.* She came Nov. 3, 1896. General health poor. Measles seven months previously, then broncho-pneumonia, mumps, suppurating glands of neck, fistulæ and sequestra in mastoid. Operation. Immediately under the skin there was a mass of necrosed bone, granulations, and pus. The sigmoid sinus was found to be beset with dark-red granulations which when removed exposed a healthy-walled sinus, soft to the touch with a sharp spoon. All the granulations were scraped away, the aditus ad antrum cleansed of granulations, the attic and tympanum laid bare and cleansed; also the posterior wall of the auditory canal was removed with a spoon. One immense cavity was thus formed out of the auditory canal, the interior of the mastoid, the tympanic

cavity, the attic, part of the posterior cranial fossa, and the pneumatic cells of the adjacent petrous and squamous portions of the temporal, all of which was carefully cleaned out with a spoon.

The first two days after the operation, temp. only 100°. The little patient picked up excellently. The after treatment required great and prolonged care. The improvement was steady. In May 31, 1897, almost completely well, no discharge. Child looks healthy. There is a large cavity behind the ear, the walls of which are evenly cicatrized. No discomfort. Seen again in the winter of 1897–1898. Perfectly well.

This child had the appearance of a consumptive. Its life was rescued by care on the part of the mother no less than by the energy and persistence of the physician, in which the assistants leading the after treatment were entitled to as much credit as the operator and surgeon in charge.

Shortly afterward another child was brought to the clinic, both of whose ears were affected in like manner as the one of the preceding case. The parents not caring to have a totally deaf and sickly child live, took it home some days after the operation where it died in a few weeks.

In conclusion, I want to mention the case of a woman who had *pyœmia* (pneumonia, etc.), in consequence of *otitic sinus thrombosis*, who was cured by a radical operation made years ago; and a child who suffered from an *otitic abscess* in the temporo-sphenoidal lobe, who was cured by a *radical mastoid operation*, lasting two hours, followed by *trephining* of the *skull, puncturing the brain, and letting out a large quantity of pus*, five years ago. The mastoid operation was far more difficult than the cerebral operation. It was radical, for the patient gradually was cured of all the discharge and discomfort from the ear; the cavity cicatrized, and has given no more trouble. Both patients, whose cases I published some years ago, are living and well. The cure of an intracranial lesion, brilliant though it may be, will not be permanent if the source of the difficulty, the mastoid disease, is not rooted out. All of which proves that the radical mastoid operation is the most important operative interference in ear surgery. It is the cataract operation in otology, and, I think, ranks as high as any operation in general surgery.

THE DETERMINATION OF ONE-SIDED DEAFNESS.

SIX ADDITIONAL CASES OF NECROSIS OF THE LABYRINTH. SUPPLEMENT TO ARTICLE ON LABYRINTH-NECROSIS AND PARALYSIS OF THE FACIAL NERVE.[1]

By Professor F. BEZOLD (Munich).

Translated by Dr. Arnold H. Knapp (New York).

With Plate III. of Vol. XXXI., German Edition.

In my monograph on "Labyrinth-Necrosis and Paralysis of the Facial Nerve,"[2] 41 cases collected from the literature to the year 1886 and five cases of my own were described. Since then I have observed five additional cases, and in a sixth, belonging to Dr. Hummel, I was enabled to perform the autopsy. Necrosis of the labyrinth is unquestionably one of the severest morbid processes that attack the auditory organ. The mortality, according to my previous paper, is 16 to 20%. The necrotic process follows a chronic middle-ear suppuration of many years' standing; its occurrence is rare, and according to my statistics there is one case of labyrinth necrosis to 500 of chronic otitis media purulenta. Where the bony parts of the labyrinth have been destroyed, a destruction and loss of function of the soft parts can be assumed to have taken place. These cases furnish us with the opportunities of determining how much an ear can hear without its labyrinth.

This question is both of theoretical and practical interest.

[1] These Archives, vol. xvi., p. 297.
[2] Wiesbaden, Bergmann, 1886.

I shall hence first give the further course of my five original cases and then describe the six additional ones.

In CASE 1 (Kuhn).—I cannot be absolutely sure of the existence of a labyrinth-necrosis as I did not see the sequestrum myself and must rely on the statement of the physician in charge.

Supplement to CASE 2 (Rieger) (see chart).—Extraction of cochlea in 1883. The patient was seen again in Feb., 1885, after one month of fetid otorrhœa without other symptoms. Facial paralysis persists. In Dec., 1888, the middle-ear spaces are dry; the facial paralysis has practically disappeared. During the following years to 1895 occasional otorrhœa, from 1895 to 1897 the cavity has remained dry. No change in the facial paralysis.

FINAL EXAMINATION OF THE HEARING.

Right, whisper in 6 *m*.

Lower tone-limit: Right, 16 d. v.; left, f sharp'[1]

Upper tone-limit, Edelmann-Galton whistle: Right, 0.2 in 30 *cm*; left, 4.4.

Duration of hearing by air-conduction.

	Normal Duration.	Right Ear.		Left Ear.	
A_2 clamped	35 sec.	$-5 = 0.86$		not	
A_1 "	75 "	$\pm 0 = 1.0$		"	
A unclamped	102 "	$\pm 0 = 1.0$		"	
a "	60 "	$-5 = 0.92$		"	
a' "	88 "	$\pm 0 = 1.0$		"	
a'' "	72 "	$\pm 0 = 1.0$	$-60 = 0.17$ of normal duration		
f''' "	33 "	$-3 = 0.91$	$-23 = 0.3$	"	"
c'''' "	70 "	$\pm 0 = 1.0$	$-42 = 0.4$	"	"
f sharp'''' "	28 "	$-4 = 0.86$	$-14 = 0.5$	"	"

Supplement to CASE 3 (Blaim, 1885).—Re-examined in May, 1897. (See chart of functional exam.)

No otorrhœa after 1885. Complete facial paralysis. Lagophthalmos.

Hearing tests.

Whisper: right, 80 *cm*; left, not at all.

Ordinary speech: right, 6 *m*; left, several numbers, as well with closed ears, no improvement on approaching from distance of 20-40 *cm*.

Lower tone-limit: right, 18 v. d.; left, a'.

Upper tone-limit: right, 0.2 in 8 *cm*; left, 7.3 in 3 *cm*.

[1] These examinations were all made with the Edelmann new tone-series.

Weber's test: A to right + 7; a to right ± 0; a′ to right + 4.
Rinne's test: right + 20 sec.; left, — ∅.

Duration of hearing by air-conduction.

	Right Ear.	Left Ear.
A_2 clamped.	0.71 [1]	not
A_1 "	0.80	"
A unclamped	0.85	"
a "	0.88	"
a′ "	0.94	"
a″ "	0.86	0.11
f‴ "	0.42	not
c⁗ "	0.59	"
f sharp⁗ "	0.82	0.36

This case is peculiar, because the hearing duration in the tone-scale does not continuously increase from a″ to f sharp⁗, and that there is a hiatus between f‴ and c⁗. This is explained by the poor perception of those tones on the other ear.

Case 4 (Dallmaier, 1883), Supplement.—Re-examination, May, 1897. The sequestrum comprised the cochlea and a part of the vestibule. (See chart.)

The left ear has only been dry during the last half-year. The auditory canal is completely shut off at a depth of 1½ *cm.* Deep scar over root of mastoid. Complete facial paralysis.

Right *Mt* diffusely clouded, small round scar in post. half.

Hearing-tests.

Whisper: right, 3½ *m*; left, not.
Lower tone-limit: right, 23 v. d.; left, a.
Upper tone-limit: right, 0.2 in 5 *cm*; left, 2.0 in 15 *cm.*

Absolute air-conduction.

	Right Ear.	Left Ear.
A_1 clamped	0.73	not
A unclamped	0.72	"
a "	0.76	only at impulse.
a′ "	0.66	" "
a″ "	0.88	0.22
f‴ "	0.73	0.33
c‴ "	0.77	0.50
f sharp⁗ "	0.79	0.54

[1] The normal hearing duration for each fork is omitted and only the resulting fraction given.

In this case the other ear shows a moderate shortening of the hearing duration for all tones, which is probably due to slight changes in the internal ear. The diminution is too slight and too uniform to be reproduced in the hearing range of the affected ear.

CASE 5 (Stirnweiss), Supplement.—The sequestrum consisted of almost the entire petrous bone; in addition, the other ear was also diseased. Recently, on inquiry, I learned that this patient had died in 1891, after a prolonged illness, during which she became totally deaf.

NEW SERIES.

CASE 6 (see chart).—Keller, age fourteen years. Otorrhœa, right, since childhood. Was examined July 1, 1887. Complete facial paralysis on right side for two weeks; some vertigo, no ataxia. On testing the hearing A, c′, a′, and a″ were not perceived. A large sequestrum could be felt with the probe. During subsequent treatment the sequestrum was discharged in fragments, the otorrhœa became very scanty, but the facial paralysis remained. Ten years later, the middle-ear cavity was found dry The facial nerve had partly recovered. The left *Mt* was normal..

Whisper: left, 6 *m*; right, several numbers are heard, but as well when ear is closed. Conversational voice: the numbers 23 and 99 are heard at 20 *cm*, but not directly at ear.

Lower tone-limit: right, h; left, 16 d. v. and lower.

Upper tone-limit: right, 1.9 in 3 *cm*; left, 0.1 in 25 *cm*, 0.2 in 6 *m*.

Hearing duration.

	Right Ear.	Left Ear.
A_2	not	0.77
A_1	"	0.89
A	"	0.92
a	"	1.0
a′	0.14	1.0
a″	0.29	1.0
f‴	0.42	>1.0
c⁗	0.51	>1.0
f sharp⁗	0.54	1

CASE 7.—Seemüller, sixty-two years old, examined April 26, 1889. The hearing in the left ear has been poor since childhood.

During the last two months profuse otorrhœa, severe pain and facial paralysis. Vertigo and tinnitus. The probe touches bare bone. *Right Mt* is opaque.

Hearing tests.

Whisper : right, 5 *cm* ; left, not.

Left.—None of the deeper forks are perceived by air-conduction up to a″ inclusive.

A from the vertex — 5, a′ from the vertex to right.

Rinne A, right ; — × Rinne a′, right + 18.

Upper tone-limit : right, a⁗ (Galton 13.5) ; left, es⁗.

On May 24th a sequestrum is removed with the forceps from the upper and back part of the middle ear, it appears to be a part of the vestibule. The patient did not return, and we were subsequently informed that he had died ten days later, after being unconscious for four days.

Case 8 (see chart).—Kimmerle, fifty-three years old, examined on Dec. 7, 1894. Left-sided offensive otorrhœa for four years, though hearing has always been poor. During last six months, pain and facial paralysis, which later disappeared. Vertigo for one year. During preceding week renewed pain. The post. wall of auditory canal is swollen ; the region behind the ear is also swollen. No signs of a perforation.

Hearing tests : None of the deep tuning-forks are perceived on the left side up to a″, by air-conduction. A and a′ are lateralized to the sound ear.

Right *Mt* is retracted. Whisper heard in 6 *m*.

The radical operation was performed on Dec. 10th, on account of the narrowness of the bony canal. In the mastoid fossa and below the temporal crest the bone was found carious and partly covered with granulations. The tympanum contained polypi. The aditus and antrum are laid bare and the outer surface of mastoid removed. Körner's plastic.

On Feb. 23, 1895, the greater part of the first turn of the cochlea came away during syringing. Nov. 30, 1895, the entire wound is healed.

The hearing was again tested. Right ear: whisper in 6 *m*. Lower tone limit, 16 v. d. and more. Upper limit 0.9 (Galton whistle normal 0.8). Left ear : whisper not heard. Lower tone-limit, a sharp″ (old series).

Hearing duration.

	Left Ear.			
a″	0.19	of the	normal	duration.
f‴	0.24	"	"	"
c⁗	0.47	"	"	"
f sharp⁗	0.57	"	"	"

The forks d sharp″ to f‴ appeared to my ear to be reinforced as they were passed by the patient's auditory canal which from the operation had become enlarged to twice the normal size and seemed to act as a resonator. The same phenomenon was noticed when I held one end of an auscultation tube close to the meatus.

Owing to the proximity of the two petrous bones, the conversion of the auditory canal of the ear with the defective labyrinth to a resonator for certain tones must influence the transmission of sounds to the other ear.

To exclude this influence, I introduced a rubber tube of the size of a normal canal in the enlarged canal and surrounded it with wet cotton to obliterate the cavity; the right canal was again occluded with wet cotton. Conversational speech was now heard by the sound ear in 3° *cm.* On the left side numbers were heard better at a distance of *2 cm* from the cranial wall than close to the meatus.

Forks from d sharp″ up were perceived. The forks f,‴ c⁗, f sharp⁗ were perceived from the left frontal eminence just as long as in front of the tube; a″ 3 sec. longer at the tube. After removal of the cotton, the forks showed the same perception, but a″ was heard 5 sec. longer at the auricle. Hence the increased resonance seems to apply to the vicinity of a″.

The whistles of the tone series were heard to their lowest limit f″ in 6 *m* with the right ear lightly closed, but exactly as well when the left canal was occluded with cotton.

The functional examination was repeated on May 22, 1897. The canal has become still broader.

Whisper, right, 6 *m.*

Lower tone-limit: right, 7.16 d. v.; left, d sharp′.

Upper tone-limit: right, 0.2 in 20 *cm*; left, 4.7 in 3 *cm.*

Weber's test: A, a, a′, a″, to right ear.

Rinne's test: left, A, a, a′ — ♆.

Duration of hearing.

		Right.	Left.
A_2	clamped	0.9	not
A_1	"	0.95	"
A	unclamped	0.9	"
a	"	0.95	"
a′	"	0.89	"
a″	"	0.88	0.28
f‴	"	1.0	0.48
c⁗	"	0.91	0.54
f sharp‴	"	0.89	0.54

The duration for a″, c⁗, and especially f‴ has increased. This is too large to be an error in observation, and can be explained by the increased dilatation of the canal since the last examination, by which the canal is tuned higher, and serves as a resonator for the other ear.

CASE 9 (see chart).—Frühwald, thirty years old, was examined on May 19, 1896. At the age of six, otorrhœa, lasting one or more years. The left ear began to discharge again one year ago, with pain. Attacks of vertigo and tinnitus. Facial paralysis during fourteen days. At present the area in front of tragus is swollen. The mastoid is not tender. Profuse otorrhœa. Polypi. Right *Mt* has a scar.

Whisper: right, 7 *m*; left, uncertain.

a′ not perceived, lateralized to right.

The polypi and granulations were removed. On June 7th a piece of dead bone with sharp edges was removed.

As the canal was narrow and cheesy masses were still present in middle ear, the radical operation was performed. The middle-ear spaces contained blackish granulations, but no sequestrum. Körner's plastic.

Subsequent healing normal, except at one place, the lower and inner portion of the inner tympanic wall. On August 5th, fainting spells for five days. No vertigo or nausea. Nystagmus on looking to the right. From the unhealed place a small piece of bone was extracted on August 30th, and on November 6th a larger piece, consisting of the first turn of the cochlea. The wound then healed entirely. On May 25, 1897, the functional examination gave:

Whisper: left, uncertain.

Conversational voice: left, most of the numbers in 30 *cm*, worse directly at ear; not worse when both ears are closed.

Weber's test: A to right, sound ear ⫠ 0; a′ to left, sound ear ⫠ 0.

Rinne's test: right, + 28; left, — ♆.

Lower tone-limit: right, 19½ v. d.; left, a.

Upper tone-limit: right, 0.1 in 12 *cm*; left, 0.4.

Duration of hearing.

	Right.	Left.
A_2 clamped	0.63	not
A_1 "	0.84	"
A unclamped	0.84	"
a "	0.92	"
a′ "	0.89	0.09
a″ "	0.88	0.23
f‴ "	1.0	0.37
c⁗ "	0.93	0.46
f sharp⁗ "	1.0	0.53

The duration for tones from a to f sharp⁗ is diminished so little that they can be regarded as normal. A stronger shortening is shown by A_2, and the lower limit of 19½ v. d, does not quite reach the lower end of the scale. Both speak for a slight change in the conducting apparatus, as is shown by changes in the drum-membrane.

CASE 10 (see chart).—Steinhauser, forty-one years old, examined on Oct. 9, 1896. Otorrhœa from both ears since tenth year. Sixteen days ago, headache and left total facial paralysis appeared. Right mastoid is tender; the left is not. Both *Mtt* wanting, with defects in bony canal. In the right middle ear, the floor and the aditus present granulations. In the left ear, the lower half of the inner tympanic wall is covered with granulations and polypi.

Hearing tests.

Whisper: right, 7 *cm*; left, not.

Lower tone-limit: right, f sharp; left, no fork up to a″ (incl.) is perceived.

Upper tone-limit: left, 4. 8.

A and a′ lateralized to right ear.

Rinne a′: right 12, left ♆.

The headache and fever, and pain over right mastoid remained until Oct. 13th. Considerable vertigo. The otorrhœa, right, ceased, and the bony cavity healed. In the left ear, the granulations had to be repeatedly removed, and each time the granulation

showed a central fistulous canal. On Dec. 22d, a yellow sequestrum, consisting of the greater part of the cochlea with the straight portion of the first turn, was removed. The discharge then ceased and the wound healed. On March 23, 1897, the left-sided facial paralysis has almost entirely disappeared.

On June 18, 1897:

Lower tone-limit: right, E; left, a.

Upper tone-limit: right, 0.6 in 3 *cm*; left, 3.8 in 3 *cm*.

Duration of hearing.

	Right.	Left.
A	0.3	not
a	0.47	"
a′	0.34	"
a″	0.50	0.07
f‴	0.51	0.21
c‴	0.69	0.39
f sharp⁗	0.64	0.54

In this case the other ear was also defective, whisper was only heard in 7 *cm*. The duration showed a gradual diminution from the upper end of the scale down as it is customary in defects of the sound-conducting apparatus. Irregularities like f sharp⁗ and a′ point to an involvement of the labyrinth on that side.

Case 11.—*Necrosis of cochlea, meningitis; autopsy.* Scheurer, twenty-one years old, admitted June 18, 1897, to Dr. Hummel's service. Otorrhœa after scarlet fever since seventh year. Three days ago, increased deafness, tinnitus, and pain in left ear. The canal is narrow, contains pus, and there is pain about the auricle. Granulations in middle ear. Temperature 38°, pulse 84; pupils react slowly. Whisper and fork a′ are not heard; a′ lateralized usually to better ear. During the following three months, headache off and on, slight fever, vertigo, vomiting, and profuse otorrhœa. The local condition in the ear was treated. General condition fair. During the night of Sept. 14th, the patient awoke with intense headache, vomiting, vertigo, contracted pupils, abdominal wall retracted and tender. On the 15th, severe chill, the pulse grew rapid, coma, rigidity of neck, and death on the 16th.

Autopsy: Dura tense. Pia vessels congested. After removal of brain, cloudy serum is found in the middle and posterior fossæ. The dura over the tegmen tympani is covered by granulations

which are surrounded by a purulent exudate. Purulent infiltration of the meninges in the base and over the Sylvian fossæ. The ventricles contained sanguinolent fluid. The brain substance shows hemorrhagic spots and superficial softening, but no abscess.

Left temporal bone: The dura, in addition to the change at the tegmen, is thickened along the posterior surface of the petrous bone. The lateral sinus is normal. The lower and anterior part of the inner tympanic wall is covered with granulations. The middle ear and a part of the internal ear are transformed into a cavity, open above and filled with sequestra and granulation-tissue; the affected part of the internal ear is situated in the posterior wall of the pyramid and extends to the porus acust. int. In the anterior part of this large cavity there is a freely movable sequestrum consisting of the cochlea. Another sequestrum is contained in the antrum; the remaining mastoid process is sclerosed. The distance from the antrum to the outer surface is 15 *mm.*

COMPREHENSIVE REMARKS ON NECROSIS OF THE LABYRINTH.

My eleven cases permit me to give a sufficiently clear picture of the symptoms of a purulent inflammation of the labyrinth which has progressed to the sequestration of bony parts. I have even been able, in the last few cases observed at my clinic, from the characteristic conditions to predict the appearance of a labyrinthine sequestrum, and which has really later occurred.

Etiology.—Labyrinthine necrosis is a condition following chronic purulent otitis. An otorrhœa of many years' duration usually goes before; there is extensive destruction in the middle-ear spaces, usually absence of drum-membrane, and a defect in the inner part of the upper and posterior bony walls of the canal, and the ossicles are more or less absent.

The otorrhœa in two cases began after scarlet fever, once after trauma, and in the other cases after unknown causes. If healthy individuals were attacked, the purulent otitis ceased soon after the casting off of the sequestrum.

In one case, No. 10, the affected ear, and also the other, showed the characteristic cholesteatomatous formation.

All of these cases applied for treatment at a time when the symptoms of an extension of the suppurating process were pronounced, and the chronic purulent otitis had previously received no treatment. In opposition to these eleven cases in which the sequestration had progressed to a certain degree, I have not seen one, among the many cases of chronic purulent otitis which have visited the clinic and have been kept under observation, where a sequestrum from the labyrinth has been cast off.

I do not believe that it is any particular form of suppurating process, or one with a peculiar germ or a general diathesis which induces these severe complications, but that they, like most severe middle-ear complications, are due to neglect of the local process.

Among the cases which I collected in 1886 was one, Christinneck, which was peculiar both as to its origin and course, and because it made the impression upon me of being a primary suppuration of the labyrinth ending in necrosis. Similar cases have been reported by Kretschmann and Trautmann. Since then a tardy occurrence or absence of perforation of the drum-membrane, especially in severe and extensive suppurations, in the middle ear, has been repeatedly observed by others and by me, and I now regard the diagnosis of primary labyrinth-necrosis as no longer justifiable. These three cases simply show that exceptionally an acute otitis media may lead to labyrinth-necrosis, though it is usually a very chronic process.

In order to examine more closely the *ways of extension of the suppuration to the labryinth*, the data furnished by the limitation and extent of the sequestrum are valuable. In nine cases where I was able to extract the sequestrum myself, it consisted six times of the completely preserved inner bony skeleton of the cochlea, once together with a portion of the vestibule. In the remaining two cases, one sequestrum cast off in early childhood was made up of the greater part of the petrous bone, including the bony labyrinth. In the second, to all appearances the wall of the vestibule was sequestrated. The sequestrum in the tenth case had previously been removed, and was said to be shaped

like a curved tube, hence might have been the semicircular canal as well as the cochlear canal. In the case that came to autopsy a sequestrum of the cochlea was present.

Generally the inner cochlear skeleton, with the entire or a part of the first turn, is the structure most liable to necrosis.

There are two ways by which the middle-ear suppuration may extend to the cochlea. First, by the accompanying inflammation of the small cells at the base of the tympanum and the commencement of the Eustachian canal, which surround the lower aspect of the cochlea to a varying degree. This system of air cells, which does not communicate with the mastoid group, is a homologue to the bulla ossea of the mammals. Secondly, by a perforation into the cochlea after rupture of the delicate membrane of the round window. In the first set it is to be expected that a part of the lower cochlear capsule should be cast off with the modiolus. This occurred, however, in only two cases. The necrosed bone usually consists of a larger or smaller piece of the internal cochlear skeleton. The beginning of the first turn is almost always found, with occasionally a neighboring part of the vestibule. The origin and extent of the sequestrum consequently make the second mode of infection, the invasion through the round window, the more frequent.

In the two cases of sequestration in early childhood, the necrosed bone was very extensive, including, in the one, the entire modiolus, with a large part of the vestibule and the porus acust. int.; in the other, the greater part of the petrous bone, with the entire labyrinthine capsule. All of the other sequestra which were removed from adults consisted only of a small part of the labyrinth, belonging, except in one, to the internal cochlear skeleton.

A survey of all the cases shows that the sequestrum formation is very much more extensive in the early years than in later life.

It is probably justifiable to regard the origin of the labyrinth-necrosis in the early years as a different one from that in adults. An inflammatory process of the well developed and vascular spongy substance surrounding the labyrinth, or extradural suppurative processes may be the cause for this

extensive necrosis. The fact that labyrinthine necrosis has been usually seen in early years of life may be explained by the sequestrum being so much larger and less liable to escape detection than in adults. In my own cases, labyrinth-necrosis occurred with equal frequency in all ages, and a peculiar predisposition in children cannot be upheld.

The initial affection, the suppurative otitis media, dates back to early youth in most cases and follows the exanthemata and the usual causes.

Whether a localized tubercular process in the auditory organ is a factor in the development of labyrinth-necrosis required some investigation. It is a well-known fact that in the final stage of a tubercular otitis media purulenta carious and necrotic processes are often present and destruction of portions of the wall and windows of the labyrinth frequently occurs. A real casting off of parts of the labyrinth is, however, very rare. In my cases of labyrinth-necrosis there were no symptoms pointing to a florid tuberculosis. I have never been able to observe in the living, nor in the thirty-nine autopsies of tubercular otitis described by Hegetschweiler, nor in the subsequent cases, a single instance of demarcation of any part of the labyrinth. A true migration and final expulsion of sequestra through the auditory canal does not occur in the tubercular processes. There is usually no, or a very slight, granulating process about the sequestrum, which is almost a constant condition in the middle ear of the tubercular otitis media in a later stage. An inflammatory reaction and formation of granulations is a necessary factor in the line of exfoliation of necrosed portions of the labyrinth. The profuse granulating process which we always saw preceding the extrusion of a sequestrum is to be regarded as the normal reaction of a healthy organism and an essential factor in the ultimate recovery.

The *clinical picture* of the labyrinth-necrosis has been fully described and I need only add a few remarks. To determine the time from the beginning of the labyrinth-invasion up to the elimination of sequestrum, we must have examined the hearing before and during the later stages. Most of my cases came under my care only a short time be-

fore or even after the elimination of the sequestrum, and total loss of hearing could only be ascertained.

Disturbance of equilibrium with simultaneous tinnitus and occasional vomiting, was mostly present (in only two cases, according to the patients, it was absent during the entire trouble) and would be more easily noticed by the patient than the occurrence of deafness in a previously impaired ear. Vertigo disappeared with the extrusion of the sequestrum, and with the tinnitus and vomiting it can be regarded as an irritative symptom of the nervous terminals in the ampullæ and sacculi. These symptoms are evident not only in the beginning of the labyrinth affection but may persist more or less continuously until a short time before the expulsion of the sequestrum. By one patient (8 and 9), whose answers were found very reliable, the vertigo was noted eight months, and, by another, one year before the sequestrum cast off. They may, therefore, be taken as the date for the extension of the middle-ear process to the labyrinth.

Paresis or paralysis of the facial nerve is a constant symptom of labyrinth-necrosis and usually appears one or several months after the first attack of vertigo. This, with the appearance of exuberant granulations in the middle ear, can probably be regarded as a sign of the progressive demarcation and commencing loosening of the sequestrum. In my previous paper I placed the frequency of facial paralysis at 80%. This is probably too low, because in the ten cases which I have followed the paralysis existed in nine. In the tenth case, which was examined six years after the removal of the sequestrum, complete paralysis existed for some time. The sequestrum in this case is the largest in my possession and comprises, in addition, practically the entire Fallopian canal. Nevertheless, no trace of facial paralysis could be found at the examination six years subsequently. The paralysis was permanent in five of the cases. In the other cases, the paralysis had existed only for a short time and had disappeared before the sequestrum was extruded.

Prolonged pain was a constant symptom and was of such severity as to prevent sleep for weeks and months, and produced a poor physical condition and emaciation. This pain

came on from two to nine months before the expulsion of the sequestrum; it was at first felt in the entire half of the head and accompanied by fever, vomiting, etc., probably due to meningeal irritation. Later the pain became localized to the ear and took on a more boring character.

Preceding or at the beginning of the symptoms the *otorrhœa* becomes *more profuse* and is creamy and very fetid.

Exuberant polypoid hypertrophies were present in all the cases, originating in the middle-ear spaces and protruding into the auditory canal. One of the cases, which was complicated with cholesteatoma and large bony defects, permits me to study closely the origin of these granulating masses. At the lower and anterior portion of the inner bony wall of the tympanum, a granulation, the size of a pea, reappeared every three or four days after removal, and always showed a central depression where a drop of pus would appear. The probe led to dead bone through this central perforation. This granulation recurred fifteen times until the sequestrum became loose. I have observed a similarly centrally perforated granulation in protracted cases of acute otitis media purulenta, and occasionally in chronic cases where a more or less large piece of dead bone proved to be the cause.

The *treatment* of labyrinth-necrosis can be discussed in a few words. It consists of systematic cleansing, insufflation of boric acid powder, and removal of granulations. This usually suffices to alleviate the acute symptoms, and the facial paralysis often disappears. A forcible extraction of the sequestrum before it is loose is not advisable. The *mastoid process is rarely involved.* In one case (No. 4), that of a $1\frac{1}{4}$-year-old child, several pieces of dead bone belonging to the mastoid had to be removed by Wilde's incision. In two cases (3 and 9), I performed a radical operation with use of Körner's flaps on account of threatening general symptoms, and thus prepared a broader exit for the sequestrum. I think that a properly executed radical operation insures a safer recovery than if the sequestrum is spontaneously eliminated through a narrow canal, especially if signs of general disturbance are present. In the two

operated cases and the case which came to autopsy, the mastoid process, except the antrum, was found solid and sclerosed. After the removal of the sequestrum all symptoms quickly subsided.

The *final result* in the ten cases was: In six, complete recovery with epidermization of the cavity. Case 7 was reported as cured by the physician. In Case 8 an atresia of the bony canal resulted. Case 9 had died probably from a complication in the other ear, which had suffered from a severe ear disease; the patient became totally deaf before his last illness. In the 10th case, death ensued eleven days after removal of the sequestrum, presumably of meningitis.

FUNCTIONAL EXAMINATION.

Some otologists have thought that even after loss of portions of the labyrinth some remnants of hearing remained. I consider this erroneous and due to the fact that it is impossible to exclude the other ear from the act of hearing.

Bec has come to the same conclusion after a large series of observations. von Stein in the "functions of the different parts of the labyrinth" has shown the various errors and mistakes which the cases with presumable remnants of hearing are liable to.

The conditions in a number of bilateral labyrinth-necrosis would be conclusive. The only two cases which were published by Gruber and Max were totally deaf, and the child observed by Max became a deaf-mute. This result, it might be said, need not necessarily occur in all ears. The preceding observations of labyrinth-necrosis have fully convinced me of the difficulty of diagnosing one-sided deafness. Reliable evidence of a remnant of hearing which could with certainty be referred to the side with the defective labyrinth could not be obtained.

In regard to the hearing of speech, a certain number of words are heard, the sound ear being closed, at some distance, though the perception is as good when the affected ear is tightly closed as in Dennert-Lucae's test.

It is striking that the improvement of hearing during this test is not proportional to the increased proximity to the

ear, as is customary in an ear with defective hearing, but on the contrary it is reversed. This condition is explained by Guye, who thinks that the head acts as a hearing screen for the other ear. A more definite picture is obtained by the use of clear tones in the testing than by speech. With aid of the continuous tone-series, we are enabled for the first time to obtain a satisfactory survey of the defects in hearing due to labyrinth-necrosis.

The results of the *osteo-tympanic* sound-conduction can be passed over in a few words, as a complete exclusion of the other ear is even more difficult than in air-conduction. Weber's test is of least value, as the results are difficult to ascertain. In none of my cases was the tuning-fork placed on any part of the skull lateralized with certainty to the affected side. The duration of bone-conduction can be lengthened or shortened according as a middle-ear affection, a normal condition, or internal-ear disease is present in the sound ear and thus gives us no data concerning the affected ear. Rinne's test with a′ or a deeper fork is of course always negative on the side with the labyrinth defect, as the fork is not perceived by air-conduction and is transmitted per bone to the sound ear.

The *aëro-tympanic* tests are therefore the only ones to give us conclusive proof of the hearing power in the affected ear. I have been able to examine seven ears in this manner. To determine the extent and size of the hearing-remnants, we must find the (1) lower and upper limits in the tones which are perceived, and (2) the duration of hearing of a number of sounds within the perceived portion of the scale.

1. Determination of the upper and lower limits of hearing.

The lower limit was determined with aid of the clamped forks of my former tone-series and with those of the new Edelmann's series. As the tones in the latter series are louder, the lower limit was found with them to be somewhat lower. In the old series, the lowest tones were found to be 3 times d sharp″, twice g′, and once f sharp′. The seventh patient (Case 10), whose other ear showed limitation of the lower part of the scale from f‴ down, could not hear any forks of the old series to a″; the loud resounding unclamped

a′ was the first to be perceived. Excepting in this case, the lower tone-limit in the old series was situated between d sharp″ to f sharp′. These lowest tones were only perceived by the strongest percussion with the elastic hammer directly at the ear. This explains why their perception in previous tests often escaped me. In the new Edelmann's series the lower limit was once a′, f sharp′, d sharp′, h, and 3 times a; *i. e.* between the octave a′ to a″.

The considerable force of sound made necessary by these experiments made it difficult to exclude the other ear. It was easy, on the other hand, to see the total defect for all tones situated lower down in all these cases of defective labyrinths. Below the a of Edelmann's series, which is heard by a normal ear at many metres' distance, not a single tone was perceived.

The upper tone-limit was determined by the modified Edelmann-Galton whistle. The upper limit for the normal ear is 0.2, occasionally at 0.1. As soon as we go down somewhat lower than this upper limit, the impossibility of excluding the sound ear becomes evident. The limit varies therefore much more than at the lower end of the scale, and my results have varied very much during the different tests. The limit 0.4 was reached but once; in 5 cases it varied between 1.9 and 4.9; in case 7 the upper limit was at 7.3. This case showed for the other ear a restriction for the upper part of the scale from f‴ up.

2. Determination of the duration of hearing.

A satisfactory survey of the hearing-remnants in ears with a defective labyrinth can only be obtained by studying the continuity and the duration of hearing of the various tones contained in the preserved hearing range after the upper and lower limits have been determined. For this purpose I have employed the unclamped tuning-forks A, a, a′, a″, f‴, c⁗, and f sharp⁗, as in my examination of deaf-mutes. These unclamped tuning-forks have a much longer period of vibration than the clamped ones; notwithstanding the greater intensity of the latter at the outset, the former are better suited for these tests. The same difference means a smaller error for the forks which die out slowly than those

which fade away more rapidly. Small errors in observation are magnified with the abbreviation of the period of vibration in the forks employed. The duration of hearing was expressed in the scale of a common unit for all tuning-forks; the normal duration was called 100 or 1, and thus the results could be directly compared. Gradenigo has given a graphic statement of the hearing-remnants in an ear with a defective labyrinth. As will be seen lower down, our results compare favorably.

The duration of hearing was determined for the above mentioned seven cases with the unclamped tuning-forks. Five ears furnished a duration measurable in seconds from a″ up; two, where the other ear was normal, showed a duration from a′ up. The lower tones which still were perceived by certain of the ears faded away so rapidly that they could not be measured. With one exception, of which mention will be made later, all of the ears with defects in the labyrinth showed a remarkable similarity in their preserved ranges of hearing from a″ or a′ upward.

The average of tones in the hearing range of the four cases where the other ear was normal gives us a′ = 0.06, a″ = 0.26, f‴ = 0.39, c⁗ = 0.48, f sharp⁗ = 0.53, and in the two cases where the hearing of the other ear was not perfect a′ = 0, a″ = 0.15, f‴ = 0.27, c⁗ = 0.45, f sharp⁗ = 0.54. We thus find a continuous increase of the hearing duration from the lowest to the highest tones within the hearing range.

Under the supposition that some nervous parts of the labyrinth remained to transmit the tone perception in the given ranges, we should not be entitled to expect such an agreement of results, but rather the opposite. If remnants of hearing, they must, in the various parts of the tone-scale, correspond with the size and position of the defects in the labyrinth, and the duration of hearing for the various tones must be an atypical one. The continuity of the hearing ranges, their constant position in the scale, and the gradual increase in the duration with the pitch of the tone would remain unexplained.

On the other hand, all of our results are easily explained by

regarding them as the evidence of the more or less imperfect exclusion of the hearing ear. We may convince ourselves of this by closing both ear-canals with the finger and noticing the tones of the forks employed in the tests. The higher we ascend in the scale, the farther can the vibrating fork be removed from the ear without our losing the sound. We find here an instance of the interesting physiological fact that the intensity with which the ear perceives tones of various pitch is in inverse relation to the amplitude, and in direct relation with the number of the vibrations in the time unit. The law begins to lose its significance near the upper end of our hearing range in the Galton whistle.

In the two cases where the hearing was defective on the other side, the hearing duration on the side with the defective labyrinth were shortened. a′ was heard for so short a time that it could not be counted. f sharp′′′′ alone was heard as long by these as by the others, probably because this tone was heard very long by the other ear, and on account of its rapid extinction did not furnish very reliable results. In the same two cases, the duration of hearing showed a more rapid augmentation than in the remaining four cases. This discrepancy is explainable if we notice that the duration for the same forks for the other ear in one of these cases shows an augmentation corresponding to the middle-ear affections present.

The above mentioned exception, Case No. 3, is of the greatest interest. There is no continuity in the hearing range on the defective side, and there is a gap betwen f′′′ and c′′′′. If we notice the duration of hearing on the other ear of this patient, we see that these two tones show a considerable diminution, namely, to 0.42 and 0.59 of the normal hearing duration, while the two neighboring tones, a′′ and f sharp′′′′, are decidedly longer, nearer the normal 0.86 and 0.82. On the defective side we find a duration for these latter tones similar to the remaining cases where the other ear was normal. By a lucky coincidence, one of the patients with a labyrinth-necrosis showed a gap in the hearing range on the sound side. If we review the various hearing ranges which we have found for the ears with de-

fective labyrinths, we see that they only reflect, more or less completely, the hearing conditions of the sound ears. This proves that an ear without a labyrinth has *no independent hearing power.*

Furthermore, we have found a prototype of how every totally deaf ear reacts to the tests when the other ear possesses relatively normal hearing.

Exact knowledge of the functional condition in one-sided deafness is in future to be counted among the essential foundations for the functional examination of the ear and a correct interpretation of its results. The practical value of a sure diagnosis of one-sided deafness manifests itself in its influence on the prognosis and treatment of the case, and on medico-legal questions.

REPORT ON THE PROGRESS OF OTOLOGY IN THE THIRD QUARTER OF THE YEAR 1897.

By Dr. A. HARTMANN.

Translated by Dr. Arnold H. Knapp.

EAR.

ANATOMY.

203. Donalies. Histology and pathology of the malleus and the incus. *Arch. f. Ohrenheilk.*, vol. xlii., 3, 4.

204. Hammerschlag, V. On the function of the Eustachian tube. (A reply to Lucae's remarks in the preceding volume of the *A. f. O.*) *Arch. f. Ohrenheilk.*, vol. xliii., p. 65.

205. Brühl, G. A method of injection of the temporal bone. *Anatom. Anzieger*, xiii., No. 3.

203. The ossicles consist, principally, of compact bone; a true spongiosa scarcely exists. In the outer layers the Haversian canals run in line with the axis of the bone; in the inner layers their course is irregular. The medulla has, in general, the outline of the bone, and is divided into many small spaces by bony septa; it is present in all bones, and extends to the very tips. The blood-supply is free. Krause.

204. Hammerschlag reiterates his belief that the Eustachian tube is normally open to the respiratory current. Bloch.

That the view of the author, that the middle ear and the naso-pharynx are in open communication, is wrong is shown by the experiments with the pneumatic cabinet, which I described in 1877 in the *Arch. f. Anat. u. Physiol.* When the pressure is increased in the pneumatic cabinet no equalization of pressure between the tympanum and the naso-pharynx takes place during respiration; this occurs only with deglutition. No air ever enters the tympa-

num with the phonation of pure vowels or palatal notes. In one case only, where the tubes proved to be patent during the state of repose in other experiments, did an equalization take place without the act of swallowing. HARTMANN.

205. The macerated temporal bones are slowly decalcified, washed in water, and dehydrated in alcohol. After closing the porus acusticus int. and the round window, mercury with glycerin is injected into the oval window with a hypodermic syringe until the metal comes out at the aqueductus. The decalcified bone is cleared in carbol-xylol and xylol, and then mounted in the latter fluid. KRAUSE.

PHYSIOLOGY.

206. STUMPF and MEYER, M. The determination of the rate of vibrations of very high tones. *Annalen der Phys. u. Chem.*, N. F., vol. lxi., 1897.

206. The authors have determined the heights of tones by the method of difference in tones in the case of Edelmann's Galton whistle, of Appunn's whistles, and tuning-forks. The conformity of their results with those of König and Melde speaks for the accuracy of the method. A constant air current should be used to blow the whistles instead of a rubber bag. They found that the rates of vibration, as determined with Appunn's forks, were inexact, and that the upper tone-limit does not lie in 50,000 vibrations, as previously accepted, as the highest tones are produced with the Galton whistle at 1.5, which represents about 20,000 vibrations. FRIEDRICH.

GENERAL.

a.—REPORTS AND GENERAL NOTICES.

207. BUSSENIUS. The clinic for diseases of the nose and throat. *Arch. f. Laryngol.*, v.

207. This is a description of the nose and throat department of the Charité, which is under the direction of B. Fränkel; 162 cases were treated during the first half-year. ZARNIKO.

b.—GENERAL PATHOLOGY AND SYMPTOMATOLOGY.

208. GÖPPERT, F. The middle ear of nursing infants in healthy and diseased conditions. (From the University Child's Hospital, Berlin.) *Jahrbuch f. Kinderkrankh.*, vol. xiv., 3.

209. ROHRER. The relations of the diseases of the ear to those of the eye. Haug's *Klinische Vorträge*, vol. ii., 5, Jena, 1897.

210. HAMON DU FOUGERAY. Note sur les diverses lésions de l'oreille, du nez et du larynx que l'on trouve chez les enfants places dans les institutions de sourds-muets ; importance de leur traitement. *Rev. hebdom.*, No. 37, 1897.

208. GÖPPERT has examined the ears of all the nursing infants under one year—73 in number—during a period of two and a half months at the Charité. The results relate chiefly to the middle-ear affections of atrophic babies. Vascular injection of the hammer in the 1st–2d month may be normal. In purulent otitis media, all injection may be wanting, and the diagnosis must be made by the opacity. In 36 autopsies both the antrum and the middle ear contained pus ; no caries. Of 145 ears, only 24.5 % were found healthy on admission, and only 9.7 % remained so. The author arrives at the following conclusions, which apply only to infants in poor general condition :

1. Otitis media is caused by coryza, pulmonary affection, and intestinal derangements ; in fact, by any disease preceded by vomiting.

2. The intestinal disease produces the aural affection by the vomiting rather than by the general marasmus.

3. Meningitis may cause otitis by the vomiting.

4. Otitis media accompanying coryza is the most frequent form to lead to perforation or to clinical symptoms.

5. Otitis media after intestinal troubles is the most benign.

6. The danger of a general infection, or meningitis, is much less than in older persons.

7. Fever or prolonged restlessness is rare, and disappears after paracentesis.

8. During the entire period, no case of convulsions due to the otitis media was observed. Directly after, a case with convulsions was observed, when the convulsions ceased after paracentesis.

9. The mild course of otitis media purulenta in these children is due, according to Kossel, to the free discharge per Eustachian tube.

209. The relation between the diseases of the ear and those of the eye, ROHRER prefaces by quoting Waldeyer's morphological parallel between the two organs : retina, organ of Corti ; choroid, connective-tissue wall of cochlear duct ; sclerotic, bony labyrinth

capsule ; conjunctival sac, tympanum ; cornea, membrana tympani ; nasal duct, Eustachian tube ; orbit, bony auditory meatus. Among the points of physiological relationship the author mentions the observation of d'Arsonval, that he became deaf for one to one and a half hours after having looked at an arc light for a few moments. Experimental physiology shows us that ocular movements may be produced by reflex paths from the ears. Cyon produced rotatory movements of the eyes by section of the semicircular canals. Baginski caused nystagmus in rabbits by injecting water into the middle ear. Mention is made of the relation of the ear and eye to the nose, to the intracranial affections (tumors, etc.), to nervous diseases (tabes, multiple sclerosis, hysteria), to general diseases (syphilis, rickets, scrofula). Nystagmus occurs frequently in chronic otitis media (Jansen, Kipp, Urbantschitsch). Obscurations of visual field (Knapp), mydriasis, and hemiopia (Moss) have been noted in Ménière's disease. The most important connection between the two organs is the change observed in the optic disc on intracranial extension of a purulent otitis. Zaufal, as early as 1881, considered operative interference to be indicated at the sign of an optic neuritis. The absence of optic neuritis, on the other hand, does not confirm the non-existence of an intracranial complication, especially of a sinus thrombosis.

BÖNNINGHAUS.

210. H. DU FOUGERAY criticises the lack of special treatment or examination of the inmates in the French deaf-mute institutions. Of 45 children in one asylum, he found 14 to be suffering from diseases of the middle ear, and was able to improve the hearing by appropriate treatment in 13. ZIMMERMANN.

c.—METHODS OF EXAMINATION AND TREATMENT.

211. KUHN, F., Giessen. A sterile, water-proof, adhesive dressing. A contribution to aseptic surgery. *Münch. medic. Wochenschr.*, 36, 1897.

212. V. STEIN, ST. The centrifuge in aural affections. *Studies out of the Bazanova Clinic, Moscow*, vol. i., No. 1, 1897, 43 pages.

213. MARTIN. Du chlorhydrate d'eucaine en rhinologie, otologie, laryngologie, comparé au chlorhydrate de cocaine. *Rev. hebdom.*, 27, 1897.

214. NICHOLS, J. E. H. A self-retaining operating aural speculum. *Transactions American Otological Society*, 1897.

215. VANSANT, E. L. A novel method for the use of dry heat in the middle-ear disease and otalgia. *Journal American Med. Association*, Oct. 9, 1897.

211. The material "Protection" is made by Evens and Pastor, in Cassel. It can also be used to hold back the hair in mastoid operations. SCHEIBE.

212. To test the static and active dynamic function of ear patients, v. STEIN has examined the passive dynamic ocular functions with a centrifugal machine. The apparatus is arranged to seat the patient, and gives a place for the physician who is observing the movements of the eyeball. In the preceding number the author has described the aim of the examination and the results he has obtained in healthy persons and those with ear trouble. FRIEDRICH.

213. MARTIN prefers eucaine because it is less toxic, and does not cause contraction of the mucous membrane. ZIMMERMANN.

214. The speculum has been devised for examinations and operations of the ear. The interior of the speculum consists of two passages in its larger and outer two thirds, and of one passage in its inner and smaller one third. The upper passage contains a small incandescent lamp of four-candle power. Operations are carried on through the lower passage. The speculum is held in position by a spring head-piece, so that the surgeon has both hands free. GORHAM BACON.

215. VANSANT describes an apparatus which is a modification of an instrument which was first devised for the purpose of dental surgery, consisting of a metallic bulb, or barrel, which contains a piece of carbon, a rubber hand-ball air-compressor, and a long, curved, pointed, steel nozzle. After heating the bulb, a current of air is forced through it by means of the hand-ball. GORHAM BACON.

EXTERNAL EAR.

216. HAUG. Further contributions on neoplasms of the external ear. *Arch. f. Ohrenheilk.*, vol. xliii., p. 10.

217. COHEN TERVAERT and DE JOSSELIN DE JONG. A lymph-angiosarcoma of the external ear. *Arch. f. Ohrenheilk.*, vol. xliii., p. 53.

218. HESSLER, Halle a. S. On rarefying ostitis of the mastoid process after infectious external otitis. *Deutsche medic. Wochenschr.*, No. 29, 1897.

216. A micro-cystofibroma of the cartilaginous auditory canal, a cylindroma of the fossa conchæ, a polyp containing cartilage tissue, springing from the border of the membrana tympani, and finally, elephantiastic hypertrophy of the auricle are fully described both clinically and histologically. BLOCH.

217. A recurring tumor of the auditory meatus situated in the soft part was easily removed after detachment of the auricle.

BLOCH.

218. HESSLER observed two cases of mastoiditis subsequent to an external otitis where the symptoms pointed to an acute empyema of the mastoid antrum. On operating, the antrum was found free from pus, but the bone, especially in the vicinity of the antrum, was discolored, brownish, brittle, but not carious. The operations were successful, though the convalescence was protracted. As the infection process could not have travelled by way of the middle ear, the author is inclined to consider these two cases as constituting a peculiar clinical picture.

NOLTENIUS.

MIDDLE EAR.

a.—ACUTE OTITIS MEDIA.

219. JACK, F. L. Some of the indications for opening the membrana tympani. *Boston Med. and Surg. Journal*, Aug. 19, 1897.

220. LAURENS. Un cas de périostite mastoidienne. *Ann. de mal. de l'or.*, etc., No. 8, 1897.

221. HAUG. Gravitation abscess below the mastoid process, and retropharyngeal abscess subsequent to acute purulent otitis media. *Arch. f. Ohrenheilk.*, vol. xliii., p. 17.

222. LUC. De la pyémie d'origine auriculaire sans thrombosinusite. *La médecine moderne*, July 10, 1897.

223. FORUS. Pourquoi les otites moyennes suppurées sont-elles si fréquentes et les mastoidites si rares. Explication de ce phénomène par des découvertes anatomiques personelles. *Ann. mal de l'or.*, etc., No. 8, 1897.

219. JACK recommends early paracentesis in cases of acute middle-ear inflammation accompanied with severe pain, marked infection, and bulging of the drum-membrane; and also in cases where there is a collection of fluid, either serous or mucous, in the tympanic cavity, following an acute catarrhal inflammation of the

nose and throat. Before puncturing the drumhead, the auditory canal and drumhead should first be rendered aseptic by instillations of a 1:5000 corrosive sublimate solution.

GORHAM BACON.

220. One of those rare cases where, after an acute otitis, a collection of pus was found on the mastoid process, though antrum and the mastoid cells proved to be free from disease. LAURENS does not believe that a mastoiditis at first existed and then recovered, but the infection was carried by the blood-vessels to the periosteum. ZIMMERMANN.

221. The title describes the case. The correct diagnosis and treatment in this case of Bezold's mastoiditis saved the patient's life. BLOCH.

222. LUC reports two cases of otitic pyæmia with symptoms of pyæmia without sinus thrombosis (osteophlebitis of Körner). *1st Case:* A boy, ten years old, was taken ill with a double otitis media after angina, in February, 1892. Paracentesis was performed on both sides with temporary relief. After a few days, a typical pyæmic fever set in, with rigors, rapid rise of temperature, and periods free from fever, which ceased, together with the otorrhœa, in the middle of April. Tenderness in the joints and tendon-sheaths, swelling and redness of the legs followed each attack. Abscesses were formed in the calf, the heel, and the dorsal region of the foot. The mastoid process never was tender. Protracted convalescence, finally cure. The angina, otitis, and abscesses were caused by streptococci. *2d Case:* A boy, eight years old, had otitis media after measles with spontaneous otorrhœa, on February 1, 1897. On February 9 a distinct pyæmic fever set in with rapid rise of temperature and almost daily chills. Notwithstanding a broad opening into the drum-membrane the fever did not stop before February 26. The only metastatic appearance was pain in the left inguinal region and behind the right trochanter on one occasion. No signs of mastoiditis. Rapid recovery.

According to Körner, free otorrhœa, no signs of mastoiditis, metastases in joints and muscles (not in the lungs), good prognosis, are the main points of this form of pyæmia, which usually occurs after an acute otitis and is different from the variety occurring in chronic cases with sinus thrombosis. The author agrees with Körner that these cases are due to a phlebitis of the small veins in the bones surrounding the tympanum and the

antrum, similar to the pyæmia after osteomyelitis of the long bones. BÖNNINGHAUS.

223. FORUS has constantly found in a large number of fresh temporal bones a delicate vertical septum dividing the tympanum in two parts : the one antero-inferior, the tubal part ; the other, a postero-superior, the attico-mastoid part. This septum is supposed to be a remnant of the embryonal mucous membrane and stretches like a sail from the ostium of the Eustachian tube between the inner and outer tympanic wall, surrounds the tensor and the chorda tympani, and is attached to the malleus in the form of numerous points and the well-known ligaments. Forus considers this membrane to be present in all fresh temporal bones, and regards it as the main check to the progression of infectious processes from the tube to the mastoid antrum. The resistance of this septum was tested by injecting water through the Eustachian tube ; water never entered the antrum unless the septum had been burst under considerable pressure.

ZIMMERMANN.

b.—CHRONIC OTITIS MEDIA PURULENTA.

224. BUCK, A. H. Remarks on the non-operative treatment of chronic suppurative disease of the antrum and vault of the tympanum. *N. Y. Med. Record*, Sept. 25, 1897.

224. BUCK believes that the so-called cleansing method, if patiently and systematically carried out, is sufficient to cure the disease in many cases, rather than the operative method, viz., removal of ossicles and Stacke's method. There are many cases, however, where an operation is necessary, but the writer believes that when the opening in the tympanic membrane through which the pus and the products of disease escape into the auditory canal is fairly large, and particularly if it occupies a high position, there can be no question about the propriety of giving the cleansing method a fair trial. The latter method consists in injections of hydrogen dioxide through curved glass tubes, the removal of all granulation material, cast-off epithelium, etc., and the insufflation of iodoform or other powders. GORHAM BACON.

c.—CEREBRAL COMPLICATION OF PURULENT OTITIS MEDIA.

225. HAEDKE, M. A case of meningitis and epidural abscess due to the influenza bacillus (Stettin City Hospital). *Münch. med. Wochenschr.*, No. 29, 1897.

226. GREEN, J. ORNE. Some of the general principles which should govern operations for otitic brain disease. *Boston Med. and Surg. Journal*, Aug. 12, 1897.

225. Pus in the temporal bone also showed presence of influenza bacilli. The connection between the epidural abscess on the frontal lobe of the brain and the suppuration in the temporal bone could not be established anatomically. SCHEIBE.

226. In otitic brain disease early operation is advisable, but an early exact diagnosis is often impossible.

The chances are 79 in 100 that a fistula through the bone from the ear will lead directly to the brain disease.

The infected ear requires operation in any case, and this operation can be combined with an exploration for the bony fistula and the recognition and treatment of the brain disease.

GORHAM BACON.

d.—MIDDLE-EAR EXTENSION.

227. SHEPPARD, J. E. Mastoiditis without, or with but little, involvement of the tympanic cavity. The *Brooklyn Med. Journal*, July, 1897.

228. LELAND, G. A. Two cases of lateral sinus thrombosis with abscess of internal jugular vein ; operated ; one recovery. One case of isolated thrombosis of bulb ; death. *Transactions American Otological Society*, 1897.

229. MALHERBE. De l'évidement petro-mastoidien appliqué au traitement chirurgical de l' otite moyenne chronique sèche. *Arch. internat. de lar. d'ot.*, No. 2, 1897.

230. MIOT. Opèration faite avec succès dans une cas d' otite moyenne sèche. *Rev. hebdom.*, No. 32, 1897.

231. EITELBERG, A. The treatment of sclerosis with thyroidine tablets. *Arch. of Ohrenheilk.*, vol. xliii., p. 1.

232. HAMON DU FOUGERAY. Un cas d' epithelioma primitif de la caisse du tympan développé à la suite d' un otite moyenne purulente chronique d' autant de 12 ans. *Ann. des mal. de l' or.*, etc., No. 8, 1897.

227. SHEPPARD reports a number of cases and draws the following deductions : A running ear is by no means always a precedent or accompaniment of mastoiditis. The most constant symptoms are pain in the mastoid region and over the side of the head ; tenderness in the mastoid region, especially at the apex,

developed by firm, deep pressure, or by percussion; a distressingly loud tinnitus, variously described by patients as throbbing, beating, puffing, or pumping; a less constant symptom, but of much significance when present, is the bulging of the posterior superior canal wall into the lumen of the canal. The late-appearing external symptoms of mastoiditis, redness, œdema, and pushing out of the auricle, should never be waited for, because of the evident fact that the time thus allowed to the pus to work its way through the outer mastoid cortex gives it the same opportunity for breaking through the inner cortex and involving the intracranial structures. While, as a general rule, where mastoiditis is suspected, it is quite proper for a few days to make use of the usual antiphlogistic abortive measures, still there are many cases where immediate operation should be advised, and as between early and late operation, the former is always the safer course. GORHAM BACON.

228. Two of the cases were those of lateral sinus thrombosis, secondary to acute inflammation of the middle ear, both with abscess of the internal jugular vein; one ending in death, the other in recovery. The third case was one of thrombosis of the jugular bulb, with the sinus free above it, followed by death.

CASE 1.—A widow, thirty-two years of age, of neurotic temperament and subject to quinsy sore throats. She had an acute suppurative otitis media with considerable pain. Later there was vomiting with nausea; chilly sensations; right meatus filled with pus; drumhead perforated in the inferior portion. A few days later there was a distinct chill with high temperature. Tenderness developed over the mastoid and the neck became stiff, and there was tenderness over the jugular vein. A week later it was decided to do a Wilde's incision. The symptoms again becoming more alarming, the original Wilde's incision was, about two weeks later, reopened and prolonged. The mastoid cells were broken down and filled with pus. The sinus was exposed. A thrombus was found in the sinus and considerable pus about it. The thrombus was removed. The patient's condition was slightly improved at first, but later she became worse and died. *Autopsy.*—Thrombosis with organization and obliteration of right lateral sinus. Purulent softening of thrombus in beginning of right int. jugular vein. Small, old, adherent thrombus in left lateral sinus. Acute sero-fibrino-purulent meningitis. Old tuberculosis in the apices of the lungs. Streptococci in lateral sinus, and in pus of pia mater of both

sides, and around cerebellum ; numerous in colonies and chains ; a few in longitudinal sinus.

CASE 2.—A boy, eight years old, had an acute suppurative otitis media, right side, followed by mastoid inflammation and pain in the head. He had a chill, followed by fever and sweating. The mastoid was opened and found soft. There was an epidural abscess and a clot in the lateral sinus. The boy recovered.

CASE 3.—A man, twenty-seven years of age, had chronic purulent otitis media, right side. Four weeks previously there was cessation of discharge and onset of pain over the whole head, with some delirium. Other symptoms developed, viz. : chill, high temperature, some swelling in ant. cervical triangle. The mastoid cells were opened and found to contain fœtid pus. In exposing the sigmoid groove, a considerable amount of foul-smelling pus came away—the contents of an epidural abscess. The mastoid antrum contained cheesy masses and granulations. The thrombus in the sinus began just posteriorly to the jugular bulb, and filled the bulb also. At the junction of the sinus with the bulb, on its upper surface, was a soft spot, where probably the septic material entered the sinus from the mastoid. The patient was not relieved by the operation. A few days later, a trephine opening was made in the skull over the right auricle, but exploration in various directions failed to show any pus. The patient died with symptoms of septicæmia, with cerebral œdema. An autopsy was refused. GORHAM BACON.

229. As the hearing is sometimes improved after operation in chronic purulent otitis, MALHERBE was induced to operate in cases of sclerosis without labyrinthine involvement. On the day following the operation, and occasionally on the same day, the hearing in spite of the thick bandage was improved and the subjective noises had gone. This extraordinary result is said to have remained in two patients even after one year. The author has operated on five cases altogether. ZIMMERMANN.

230. During the last year MIOT has removed the membrana tympani in fourteen cases of sclerosis ; he describes the following case : A young man (no age given) heard the watch, left on contact, right in 12 *mm ;* after the operation, was able to hear the watch, left in 6 *cm*, right in 18 *cm ;* it is not stated whether subjective noises were present or altered, or not. Miot says the hearing of all patients operated upon fluctuated, accord-

ing as the exposed tympanic mucous membrane was caused to swell. The operation is indicated when the affection is bilateral or when it is monolateral with oppressive noises and loss of accommodation (?). ZIMMERMANN.

231. Eight cases were treated with thyroidin; from the given data it is difficult to say whether these were really cases of sclerosis. Though the results were meagre, the author advises continuation of the experiments. BLOCH.

232. A woman forty-three years old suffered with a fœtid otorrhœa, great pain, and frequent hemorrhages from the left ear. An operation was refused and when seen again a few months later the mastoid process was very much swollen. The operation was then undertaken and the middle ear and antrum were found converted into a large cavity, filled with tumor-like masses which had broken through the tegmen. A radical extirpation was impracticable and the patient died in six weeks. No autopsy. The histological examination showed the growth to be a carcinoma of the squamous epithelial type. The tumor had evidently at the beginning been confined to the middle ear and had progressed anteriorly. ZIMMERMANN.

NERVOUS APPARATUS.

233. LEWIS, ROBERT, Jr. A remarkable angio-neurosis of the tongue, due to the application of chromic acid to granulations on the upper and posterior portions of the tympanic membrane. A contribution to the physiology of the chorda tympani nerve. *Transactions American Otological Society*, 1897.

234. BURNETT, C. H. Ear vertigo, from anæmia of the labyrinth. *Philadelphia Polyclinic*, July 10, 1897.

235. BLAKE, C. J. Intra-tympanic disease as a factor in the causation of aural vertigo. *Boston Med. and Surg. Journal*, July 1, 1897.

236. BARNICK, O. On fractures of the base of the skull and the accompanying hemorrhages in the aural labyrinth. *Arch. f. Ohrenheilk.*, vol. xliii., p. 23.

237. KREPUSKA. Primary sarcoma of the Gasserian ganglion, and its relation to the function of the auditory organ of that side. *Sitzungsber. des Gesellsch. der Ungar. Ohren. Kehlkopfärzte*, No. 4, 1897.

238. FRIEDRICH, E. P. Contribution to the study of tabetic deafness. *Verhandl. der deutsch. otol. Gesellsch.*, 1897, pp. 38–48.

233. The case reported by LEWIS was that of a married woman, aged forty-eight, of average good health, not of a nervous temperament, who was suffering from a left chronic otitis media purulenta of some years' duration. On examination, there was found a perforation in the posterior superior quadrant of the drumhead, filled with granulation tissue. The latter tissue was removed with a curette, and the base cauterized with chromic acid. She was directed to syringe the ear with a bichloride solution, to be followed by the instillation of alcohol drops. Later, powdered aristol was insufflated. She complained shortly after this that her tongue suddenly became so swollen that she could hardly breathe for a few hours. The discharge had ceased at this time, and but little was thought of the swelling of the tongue. About six months later, however, there being a renewal of the discharge, it became necessary to cauterize the granulations again. Twelve hours after the application of the chromic acid, her tongue began to swell very rapidly, so that she could not protrude it, nor could she shut her jaws. By the administration of purgatives, the local employment of ice, tannic acid, leeches, etc., about three hours after the œdema first showed itself, the swelling began to subside, and within twenty-four hours after the application of the chromic acid the œdema had practically disappeared. Accompanying the glossal œdema and the œdema in the submaxillary region, there were small areas of œdema over the right frontal eminence, over the balls of both thumbs, over the internal malleolus of one ankle-joint, and under the ball of the right foot.

GORHAM BACON.

234. Anæmia of the labyrinth, causing deafness, tinnitus, and vertigo, may be diagnosed in two ways, viz. : by the temporary congestion induced by eating, and also by the inhalation of nitrite of amyl. If temporary improvement in all or any of these symptoms ensues after eating or after the inhalation of a few minims of nitrite of amyl, the conclusion is that the case is one of chronic anæmia of the labyrinth, and that the case may be beneficially treated by doses of trinitrin $\frac{1}{100}$ grain two or three times daily.

GORHAM BACON.

235. The writer believes that the sense of degree of disturbance of equilibration is, all other things being equal, in definite relationship to the degree of fluid displacement induced by mechanical causes, and, second, that the auditory nerve offers no exception to the general rule of acquired toleration of a dis-

turbing influence of a degree within the possible limits of compensation.

The writer reports two cases of aural vertigo, in one the cause being due to the presence of granulations about the stapes, and in the other, to cholesteatomatous masses about the incus and stapes. Both cases were relieved of the vertigo by removing the granulations in the one and the cholesteatomatous masses in the other.

GORHAM BACON.

236. CASE 1.—Fatal fall on occiput, transverse fracture of the right petrous bone, fissure through roof of antrum with blood in tympanum, hemorrhages in the trunks of the acoustic and facial nerves, in the basal winding of the scala vestibuli, the bony canals of the labyrinthine nerves, and in the region of the maculæ acousticæ.

CASE 2.—A fall of twelve feet; death four hours later. Fracture of the right squama passing through the upper wall of the canal and the tegmen tympani, rupture of the drum-membrane, fissure in the floor of the auditory canal and the tympanum to the post. lacerated foramen, separation of apex of petrous bone, numerous hemorrhages in vestibule and semicircular canal, in the Fallopian and other canals. Cochlea normal.

CASE 3.—Rapidly fatal fall of nine feet. From the occipital bone numerous fissures pass outward in both petrous bones; R. through the apex; L. through the tegmen tympani. Blood in pneumatic spaces of both sides. L. the fracture passed through the round and the oval windows, leaving both widely open. Cochlea contained hemorrhages.

CASE 4.—Jump from a moving train, fracture of base, death in two days. R. petrous bone separated from the squamous portion and the mastoid process. Tear through membrana flaccida, dislocation of both joints, hemorrhage in all pneumatic cavities, in the cochlea, in the trunk of the auditory and the nerves of the semicircular canals.

Five further cases are described which terminated favorably, though a fracture was probable. BLOCH.

237. The history and autopsy report of a case of alveolar sarcoma of the right Gasserian ganglion with numerous metastases. The intense otalgia with which the disease began is diagnostically important for disease of the trigeminus. The increasing deafness and tinnitus on the affected side are regarded by the author as a reflex action of the fifth nerve on the terminal portion of the eighth nerve. FRIEDRICH.

238. The views in regard to the site and kind of lesion in tabetic deafness are still divided. This deafness has been supposed to be due to atrophy of the auditory nerve, to atrophic disturbance of the middle ear caused by a tabetic affection of the trigeminal nerve, or finally to a syphilitic disease. Based on the reported autopsies and clinical histories the author thinks that the most frequent form of the affection with gradual onset and leading to marked nerve-deafness is due to a lesion in the primary neurone of the acoustic tract. Thus the process must begin in the peripheric terminations of the auditory nerves, and is analogous to the atrophies of peripheric sensory nerves observed in tabes. Concerning the apoplectiform variety with the Ménière symptom-complex, the author is of the opinion that it is probably a disease of the acoustic nuclei, and that the clinical picture is a form of auditory crisis.

NOSE AND PHARYNX.

a.—ANATOMY.

239. BERGEAT, M., Munich. The air cells in the middle turbinated bone. *Münch. med. Wochenschr.*, No. 35, 1897.

239. The author has found that air cells are found much more frequently in the middle turbinated bone than has previously been supposed. He differentiates between air spaces which are only contained in the middle turbinated, those which communicate with the sup. nasal meatus and have only been shut off by the middle turbinal, and those which have been caused by adhesions between the middle turbinal and the septum. In forty cases of cellular turbinals, pus was found three times. KRAUSE.

b.—METHODS OF EXAMINATION AND TREATMENT.

240. LICHTWITZ, L., Bordeaux. Illumination with acetylene gas in laryngology, rhinology, and otology. *Münch. med. Wochenschrift*, No. 39, 1897.

241. MINK, P. J., Zwolle. A nasal forceps. *Arch. f. Laryngol.*, vol. vi., No. 1.

242. SCHEIER, MAX, Berlin. On the use of X-rays in rhinology and laryngology. *Arch. f. Laryngol.*, vol. iv., No. 1.

243. LINDT, W., Bern. The direct inspection and treatment of the naso-pharynx. *Arch. f. Laryngol.*, vol. vi., No. 1.

244. JANKAU, L., Munich. A new nasal speculum and inspirer. *Arch. f. Laryngol.*, vol. vi., No. 1.

245. WANDLESS, H. W. Curettes for operating in the naso-pharyngeal vault. *Journal Amer. Med. Associat.*, July 17, 1897.

246. WANDLESS, H. W. New intranasal instruments. *N. Y. Med. Journal*, Aug. 21, 1897.

240. LICHTWITZ prefers acetylene gas to the Welsbach or the electric light. It is also cheaper, and without danger.

SCHEIBE.

241. MINK has devised a delicate forceps similar to Juracz's, to remove polyps and hypertrophies of the post. ends of the turbinals through the nasal passages. ZARNIKO.

242. On the plate of barium-platinum cyanide held parallel to the median line next to the head of the patient, the antrum of Highmore appears a lighter area, the frontal sinuses are sometimes quite transparent, and the sphenoidal cells cannot be recognized. Foreign bodies in the nose or in the accessory cavities are noticeable if they prevent the passage of the X-rays. The various shades of lightness in the accessory cavities are as inexact as in transillumination with ordinary light. In a case of purulent discharge from the nose, a foreign body (a bullet in the frontal sinus) was supposed to be the cause; the X-ray photograph showed that the bullet was lodged near the Gasserian ganglion.

ZARNIKO.

243. LINDT has suggested, independent of Katzenstein, a method for the direct view of the naso-pharynx. After the post. pharyngeal wall and the soft palate have been cocainized, the soft palate is drawn forcibly forward with a special hook, and the patient's head is thrown back. The middle recess of the pharyngeal tonsil can then be seen in favorable cases, also a part of Rosenmüller's fossa, the salpingo-pharyngeal plica, and the pharyngeal mouth of the Eustachian tube. These parts can be easily treated locally. The author considers this method as a supplement, the indirect rhinoscopy. ZARNIKO.

244. An egg-shaped instrument of vulcanite is inserted in the vestibulum nasi, so that the lateral opening is directed down and the rounded pole looks back; it is supposed to hold the alæ nasi apart easier than the instrument of Feldbauschi. This instrument can also serve as an inhaler. ZARNIKO.

245. WANDLESS devises a pair of curettes, each of two different sizes. One pair with a flat curve is adapted only to the pos-

terior wall of the pharynx; the other, set at an angle of 45° to the handle, for the removal of adenoids from the roof of the vault. M. TOEPLITZ.

246. WANDLESS devised (1) for the removal of small spurs or uneven portions after operations, an intranasal rasp, made right and left; (2) a pair of new nasal saws, with low teeth wider than the blade, cutting with both to and fro movements, made of stiff metal, and having a narrow point; (3) a pair of groove-saws, round, with teeth on convexity, to substitute the knife, gouge, or punch. M. TOEPLITZ.

c.—OZÆNA.

247. MENDELSOHN, Dr. MARTIN. On ozæna and the treatment with interstitial cupric electrolysis. *Monatschr. f. Ohrenheilk.*, No. 8, 1897.

248. BRINDEL. The treatment of ozæna with interstitial electrolysis. *Rev. hebdom.*, Nos. 34 and 35, 1897.

249. COMPAIRED. The new treatment for ozæna. *Ann. des mal. de l'or., du lar.*, No. 5, 1897.

250. MOURET. On the treatment of ozæna. *Rev. hebdom. de lar., d'ot.*, No. 38, 1897.

247. MENDELSOHN'S experience with electrolytic treatment of ozæna in ten cases was not favorable. The temporary improvement consisted in diminution of the fetor and removal of the crusts. One mild case seemed to be cured after five months. On the day of treatment and on the following days, pain in the face and head was complained of. KILLIAN.

248. BRINDEL has tried Bayer's method of treatment with electrolysis in 30 cases, and concluded that permanent relief is not obtained. During the first two weeks there is some improvement in the symptoms, but relapses soon come on again. He believes to have obtained better results with massage of the mucous membrane and subsequent application of the nitrate of silver. ZIMMERMANN.

249. The author warmly recommends the serum therapy. The injection dose is 5 to 6 cubic *cm*; the subjective symptoms disappeared after the third injection; the objective symptoms somewhat later. He has thus far treated 27 cases of ozæna with good results. ZIMMERMANN.

250. A complete clinical history of an ozæna patient. The secretion contained streptococci, diplococci, and a peculiar bacil-

lus. The treatment consisted in cleansing and insufflation of aristol; later massage, and cauterization with zinc chloride. Then serum injections were practised, and finally electrolysis, also without result. ZIMMERMANN.

d.—SEPTUM.

251. POLLAK, J., Vienna. On perichondritis serosa of the nasal septum. *Wien. med. Wochenschr.*, No. 27, 1897.

252. COLONNA-WALEWSKI, A. DE. Abscess of the septum. Paris, G. Steinheil, 1897.

251. POLLAK believes that a primary inflammation of the quadrangular cartilage is the etiological factor in the perichondritis serosa, as well as in the hematoma and the ac. idiopathic perichondritis. The process is similar to that which has been described for the auricular cartilage as the cause for the othæmatoma by Parreidt, L. Meyer, Gudden, and Pollak, and consists in a degeneration of the cartilage, softening, vascular new formation. POLLAK.

252. COLONNA-WALEWSKI gives a complete picture of the abscesses of the septum from 36 cases, some of which are new. The origin is usually traumatic and succeeds a hematoma. In the idiopathic cases the infection takes place through very small ulcerations. The treatment is incision and gauze packing. HARTMANN.

e.—OTHER AFFECTIONS OF THE NOSE.

253. SEIFERT, Würzburg. Rhinitis nervosa. *Münch. med. Wochenschr.*, No. 36, 1897.

254. JOAL. Epistaxis dues aux odeurs. *Rev. hebdom.*, No. 26, 1897.

255. SACHS, R., Hamburg. Primary tubercular tumor of the nose and larynx; operation; cure. *Münch. med. Wochenschr.*, No. 38, 1897; supplement No. 42.

256. MILLIGAN, WM. A large exostosis removed from the right nasal passage. *Brit. Med. Jour.*, Aug. 7, 1897.

257. CAMPBELL, J. T. Croupous rhinitis. *Annals of Otology, Rhinology*, etc., August, 1897.

253. After a review of the well-known symptoms, SEIFERT states that he always found nervousness present in his cases. During the quiet periods the mucous membrane appeared pale but very relaxed; during an attack one or both lower turbinates

are swollen, the mucous membrane remains pale, and the epithelium is still more relaxed. Cocaine has but little effect on the swelling. SCHEIBE.

254. In three nervous persons hemorrhages ensued from the nose after the smell of flowers, of incense, of petroleum, and of various perfumes. The objective signs are slight; in one case it could be directly observed that the lower turbinals became injected, with sneezing and hypersecretions. It is probably a vasomotor process, which can lead to a congestion or rupture of the blood-vessels. ZIMMERMANN.

255. The tumor in the nose originated in the cartilaginous septum and contained tubercles, and in places cheesy parts. Bacilli were not found. Lungs normal. Healing after curetting and lactic-acid application. In one case the tubercular growth was bilateral. The largest tumor measured 6 *cm* by 2½ *cm.* SCHEIBE.

256. At a meeting of the British Laryngological, Rhinological, and Otological Association, held on July 16th, MILLIGAN showed an exostosis measuring 1½ by 1¼ inches, and weighing 9 drachms, which had been removed from the right nasal passage by means of an incision along the side of the nose; it projected upwards through the right lachrymal bone, displacing the lachrymal duct, and was found to spring from the right orbital plate of the superior maxilla, and to have grown upwards and outwards, destroying the lachrymal bone, filling up the antrum, and almost completely occluding the nasal passage; its pedicle, ¼ inch in length, had become gangrenous and the exostosis lay free in the cavity it had formed. The patient made an excellent recovery. CHEATLE.

257. CAMPBELL gives a complete review of the literature on fibrinous rhinitis, from which he collects 120 cases, including four of his own observation, eighty of which were bacteriologically examined. Sixty-five cases presented Klebs-Loeffler bacilli associated with streptococci and staphylococci, one with Fraenkel's pneumococcus, and one with erysipelas. In two thirds of all the cases fibrinous rhinitis must be recognized as local diphtheria. M. TOEPLITZ.

f.—NEW FORMATIONS IN THE NOSE.

258. MACDONALD, GREVILLE. Injections of chromic acid for nasal polypi in a hæmophylic. *King's College Hospital Reports*, vol. iii., 1897.

259. LICHTENBERG, K., Budapest. Removal of a nasal polyp, ac. otitis media, otogenous abscess of the middle fossa; antrectomy; trephining of skull; recovery. *Wien. med. Wochenschr.*, No. 29, 1897.

260. FINDER, GEO., Charlottenburg. Some remarks on malignant tumors of the nose. *Arch. f. Laryng.*, vol. v.

258. MACDONALD'S patient was a man aged thirty, who had both nostrils blocked with large polypi; he had had them removed at two hospitals at various times; the hemorrhage, even when the galvano-cautery was employed, was so great that plugging had to be resorted to. Injections with a hypodermic needle of a solution of chromic acid (10 grains to the ounce) were tried, from 5 to 10 minims being injected into the polypi of each nostril at a sitting. After three or four sittings he could breathe quite comfortably, and the treatment was continued, with still more rapid results, by thrusting a grooved needle, on which was wound a film of cotton wool, into the bases of the polypi, the needle with the cotton wool having been previously dipped into a saturated solution of chromic acid. The patient never suffered from any pain or irritation of the nostrils.

ARTHUR CHEATLE.

259. After removal of a nasal polyp an ac. otitis media set in with fever, delirium, vomiting, insomnia, and headache. There was a small perforation in the upper and posterior quadrant with continuous discharge of pus. On operating, the mastoid was found carious at a depth of $\frac{3}{4}$ *cm*, but antrum contained no pus nor any fistulous tract. A trephine opening was then made over the temporal line and considerable pus escaped from a subdural abscess. Recovery. POLLAK.

260. Among 28,000 patients at Fränkel's clinic, the author found ten unquestionable cases of sarcoma of the nasal passages (two round-celled, two spindle-celled, one epithelioma), and several uncertain cases. This shows the relative frequency of sarcoma. He advises great circumspection in the question of metamorphosis of benign to malignant tumors; the observations are usually erroneous. The author emphasizes with Dreyfuss the frequency of hemorrhages in sarcoma and their rarity in carcinoma. Carcinomata tend to slough; the sarcomata lead to protrusion of the bones. He was unable to agree with Dreyfuss that carcinoma showed little tendency to involve regionary lymph glands and that the sarcoma frequently produced metastases. The diagnosis is often

difficult. Prognosis in carcinoma is absolutely bad, in sarcoma somewhat better, as operative interference may insure freedom from recurrence for years. Carcinoma should not be operated upon ; a careful institution of nasal breathing is the best that can be done. ZARNIKO.

g.—AFFECTIONS OF THE ACCESSORY CAVITIES.

261. ALEXANDER, A., Berlin. Nasal polypi, their relation to the empyemata of the accessory cavities. *Arch. f. Laryng.*, vol. v.

262. ALEXANDER, A., Berlin. Mucous cysts of Highmore's antrum. *Arch. f. Laryng.*, vol. vi.

263. PHOTIADES. A new after-treatment for empyema of the accessory nasal cavities. *Ann. des mal. de l'or., du lar.*, No. 5, 1897.

264. ESCAT. Contact illumination of the maxillary sinus or retromaxillary illumination. *Rev. hebdom.*, No 28, 1897.

265. LUC. Acute traumatic suppurative meningitis checked by opening of the skull and antiseptic irrigation of the pia. *Arch. internat. de lar., d'ot.*, No. 2, 1897.

266. SCHEPPEGRELL, W. The treatment of suppurative diseases of the accessory sinuses and of the ear by ozone gas. *Med. News*, July 31, 1897.

267. FEHLEISEN, F. Diagnosis and treatment of affections of the frontal sinuses. *Medical Record*, August 7, 1897.

268. MYLES, ROBERT C. Diseases and treatment of nasal accessory sinuses. *Medical News*, August 7, 1897.

269. HOWARD, W. T., and INGERSOLL, J. M. Notes on the etiology of inflammation of the accessory sinuses. *Medical News*, Sept. 25, 1897.

270. WÜRDEMANN, H. V. Empyema of the maxillary, ethmoidal, and sphenoidal sinuses, attended by general septicæmia, following attempted removal of inferior turbinated body ; operations ; recovery. *Annals Otology*, etc., August, 1897.

261. ALEXANDER has examined the accessory cavities in 274 cases at Fränkel's clinic: 69 cases of nasal polypi without empyema, 125 empyemata without polypi, and 80 cases of empyemata with nasal polypi. In these the antrum of Highmore was diseased 57 times, the ethmoid cells 8 times, the sphenoidal cells 5 times, and the frontal cells once. A middle

turbinal containing bony cells with pus and showing œdematous swelling and polyp-formation was examined microscopically in serial sections. The results of Hajek, *Arch. f. Laryng.*, vol. iv., were confirmed. The author regards polypi as inflammatory new-growths. ZARNIKO.

262. ALEXANDER obtained serous fluid by aspiration from the maxillary antrum in six patients ; in four the antrum was broadly opened and showed that the serum came from mucous cysts. Neither the subjective nor the objective symptoms are sufficient to make the diagnosis of mucous cysts. They are usually not discovered before aspiration or opening of the cavity is practised. ZARNIKO.

263. PHOTIADES thinks that by free ventilation the duration of frontal sinus empyema can be shortened, and inserts a silver drainage-tube with lateral openings. ZIMMERMANN.

264. ESCAT has devised a small 4-volt light to be placed behind the last upper molar and so transilluminate the maxillary antrum from behind forward. In three cases where the transillumination from the mouth showed shadows, he was able by his method to show a transparent cavity, and once to confirm the shadow found by the usual method. ZIMMERMANN.

265. A woman, thirty-three years old, was operated upon for a tumor at the upper and inner eyebrow with apparent success four years ago. The swelling returned, with pain and exophthalmus. At operation, the outer wall of the frontal sinus was soft and protruding, the bone eroded. A colloid material was evacuated, and the cavity contained fungous masses which had perforated the lower side. Curettage, cauterization, drainage to nose, closure of external wound. The symptoms persisted, and as the fungous masses proved to be sarcomatous, a wide opening into the orbit was made, and the tumor masses were thoroughly scraped; drainage to nose, external closure. The exophthalmus was relieved, but intermittent fever, pain, and general weakness led to a third operation. Behind the healthy dura a square *cm* of purulently infiltrated pia was found, but no abscess. Later two abscesses in the frontal lobes were found. Further remarks on this case are promised. ZIMMERMANN.

266. SCHEPPEGRELL has made a number of tests with oxygen gas, as recommended by Dr. George Stokes, but his results were unsatisfactory. He describes an apparatus for generating ozone, which he has used in chronic antral disease, in a case of combined

empyema of the frontal and maxillary sinuses, three cases of chronic otitis media, and two cases of ozæna. He claims to have had remarkably good results from its use. GORHAM BACON.

267. FEHLEISEN differentiates, like Kuhnt, a sinusitis catarrhalis, blennorrhoica, pyorrhoica, and capsulated empyema, without drawing strict lines between them. The etiological factors are *infection*, by simple coryza or infectious diseases (measles, diphtheria, typhoid fever, pneumonia, influenza, and syphilis), *traumatism*, and tumors, parasites, or foreign bodies. For diagnosis he lays great stress upon Kuhnt's sign of tenderness of the bone upon pressure, particularly at the floor of the sinus. He thinks the importance of the obstruction of the ductus naso-frontalis to be greatly overrated. He prefers the operation from in front for radical operation, but only after opening the ductus naso-frontalis by sounds, and after removal of the anterior end of the middle turbinal. In radical operations the duct is left untouched, if found to be closed. M. TOEPLITZ.

268. MYLES has opened six frontal sinuses externally; in one case through the anterior wall of the ethmoid cells and the floor of the sinus. Two cases of fronto-ethmoidal necrosis were opened through the nose by removal of the anterior end of the middle turbinated body, the internal wall of the infundibulum, and part of the floor of the frontal sinus. In eight out of ten cases, there existed polypoid degeneration, which caused, according to Myles, but against the reviewer's views, two thirds of the ethmoid cases, the others being due to atrophic rhinitis, to non-syphilitic necrosis by retention of pus, and to syphilis and tumors. Three cases of sphenoidal empyema were opened through the upper wall; two were of polypoid, one of syphilitic, origin. The treatment is expectant, explorative, and radical. The different methods, through the alveolus, canine fossa, between hard palate and alveolus, or through malar ridge, are all good in suitable cases.

M. TOEPLITZ.

269. Among eighteen cases examined, the antrum Highmori was involved in fifteen, with a total of seventeen antra, alone in eleven, combined with ethmoid or frontal affection in three and one, respectively. Three antral cases were acute, two after influenza. The different bacilli causing these conditions are well established for each case, and the reader is referred for the details to the original. The chronic cases were due to influenza, coryza, pneumonia, syphilis, dental caries, and atrophic rhinitis; nasal

polypi were present in three cases. In three cases the frontal sinuses were affected, in two alone, in one combined with antral and ethmoid affection, and their bacteria were fully described. Primary inflammation of frontal sinuses is not uncommon; inflammation of ethmoid cells, however, is, according to authors, observed only as secondary to antral or frontal disease.

M. TOEPLITZ.

270. A young man, æt. twenty-four, was operated for supposed polypi and hypertrophy of the left inferior turbinated body, with forceps, snare, and saw, during eighteen hours. Seven days later, when first seen by WÜRDEMANN, pain had developed in left side of face, with swelling of left face and neck, exophthalmus, chemosis, prolapse of conjunctiva, pus from left nostril, 101.3° F. After opening the maxillary antrum from the nose and canine fossa, and the ethmoid and sphenoid sinuses from the nose, the condition was impaired, and only improved thirteen days later by incision in suborbital furrow, through which two and a half ounces of foul pus were discharged. M. TOEPLITZ.

NASO-PHARYNX.

271. SIEBENMANN, Bâle. On adenoid habitus and leptoprosopia, and on the short septum of the chamæprosopes. *Münch. med. Wochenschr.*, No. 36, 1897.

272. ARROWSMITH, H. A clinical study of 701 cases of naso-pharyngeal adenoids observed in 2000 dispensary patients. *N. Y. Med. Journ.*, August 28, 1897.

273. BECKMANN, H., Berlin. On the pathology and therapy of the pharyngeal tonsil. *Monatschr. f. Ohrenheilk.*, No. 9, 1897.

271. SIEBENMANN, after a number of measurements which are described in a dissertation of Fränkel, holds the generally accepted view, that the arching of the hard palate occurs more frequently in individuals with adenoids than in those with a healthy naso-pharynx, to be erroneous. Individuals with arched palates have narrow nasal passages, hence are troubled more with insufficient breathing space than those with low palates and wide noses. Facial measurements of adenoid patients have shown that the face and nose are narrow (leptoprosopia) when the palate is high and broad, chamæprosopia, when the palate is low.

SCHEIBE.

272. ARROWSMITH finds among 2000 patients, 858, or 42.9 per cent., subject to chronic hyperplasia of the faucial, pharyngeal, or lingual tonsils. The hyperplasia is more common in the female sex, particularly as lingual tonsils. Up to the fifteenth year of age the males are suffering more from adenoids (283 : 209); in later periods, the proportion is reversed. Adenoids alone were observed in 18.4 per cent.; adenoids and tonsils in 16.65 per cent.; tonsils alone in 5.05 per cent.; and lingual tonsils in 2.8 per cent. M. TOEPLITZ.

273. BECKMANN removed adenoids with his own instrument down to the basilar fibro-cartilage, and sometimes a thin layer of this is also removed. He operates in 50 per cent. of the patients that come to his clinic, and thus has performed the operation 5000 times. He considers the previous methods of operating to be insufficient, and that the operation is not often enough performed. In his mind, adenoids are the beginning of most of the diseases of the upper air-passages and the ears. Acute coryza is a primary inflammation of the pharyngeal tonsil. Angina lacunaris and peritonsillar abscess are secondary to disease of this tonsil. The pharyngeal tonsil is an etiological factor in chronic catarrhs of the nose, pharynx, and larynx, in granular pharyngitis, ear trouble, etc. The author operates on children with acute coryza and acute otitis when they are over three weeks old. In 1893, 63 children under one year were operated on. Infections after operation have occurred. The frequency of post-operative hemorrhage is not stated. KILLIAN.

SOFT PALATE, PHARYNX, AND BUCCAL CAVITY.

274. BLODGETT, ALBERT N. Entire destruction of soft palate and velum by syphilis. *Boston Med. and Surg. Jour.*, Aug. 5, 1897.

275. GAREL. Intermittent paresis of the soft palate in neurasthenia. *Rev. hebdom.*, No. 33, 1897.

276. HEGMANN, P. Stricture and adhesions of the pharynx and naso-pharynx. Reprint of the *Handbuch d. Laryng. u. Rhinol.*

277. MIKULICZ, J., and KÜMMEL, W., Breslau. I. Diseases of the mouth. II. Local diseases of the mouth. Reprinted from the *Twentieth Century Practice.*

278. RENNER, W. S. Chronic follicular tonsillitis. *Med. Record*, Aug. 28, 1897.

279. GLEITSMANN, J. W. Treatment of chronic affections of the faucial tonsils. *N. Y. Med. Jour.*, Sept. 4, 1897.

274. A boy, æt. fourteen, was infected with syphilis three and a half years ago, by vaccination with humanized virus, and as the result had lost the velum and soft palate, the defect being of irregular contour with indurated and undermined margins.

M. TOEPLITZ.

275. GAREL has observed three cases of intermittent paresis of the soft palate. Speech would suddenly become nasal, and in swallowing, particles of food would enter the nose. On examination the soft palate was vertical and immovable. No previous history of diphtheria, and the paralysis would disappear in several seconds or minutes. Neurasthenia was present in all cases. In the treatment, faradization was of no benefit.

ZIMMERMANN.

276. Uniform narrowing of the pharynx and naso-pharynx, according to the author, produce symptoms more often than is supposed. A description of stricture due to abnormal membranous formation, deformities of the vomer, and lordosis, and finally those due to cicatrization are discussed. They are most often due to syphilis; in some regions they are produced by scleroma; also by lupus and diphtheria, and occasionally traumatism. In conclusion the treatment is discussed.

PASSOW.

278. RENNER distinguishes the chronic follicular tonsillitis, which is characterized by the formation of plugs of secretion in the crypts of hyperplastic tonsils—the plugs being yellowish white, offensive, of cheesy consistence, and composed of leucocytes, epithelium, chalk, mucus, various bacteria, and leptothrix—from mycosis of the tonsils with dense projections like cockspurs made up entirely of leptothrix or other mycotic growth, recurring rapidly when removed. For diagnosis the anterior pillar is to be pulled forward. Cases with varied and obscure symptoms are cited.

M. TOEPLITZ.

279. GLEITSMANN describes the chronic inflammation of the follicles of the faucial tonsils, in which they present an irregular contour, with destroyed follicles, the lacunæ filled with white masses. The inner surface and the uppermost (velar) portion of the tonsil is brought into view by a palate hook. The crypts are opened with Mor. Schmidt's hook, but with sharpened edges, also used for the separation of adhesive pillars. Associated with the

above-described condition is a fold on the tonsils. This is best removed by a modification of Ruault's punch, with considerably smaller blades, now cutting in a horizontal plane. The same instrument, still smaller, may be used as a conchotome.

M. TOEPLITZ.

MISCELLANEOUS.

THE AMERICAN OTOLOGICAL SOCIETY will meet July 19th at the Pequot House, New London, Conn.

AMERICAN MEDICAL ASSOCIATION, Pres., GEO. M. STERNBERG, Washington, D. C. Place of meeting, Denver, Colo., June 7–10, 1898. Section of *Laryngology and Otology*, Pres., B. ALEX. RANDALL, Philadelphia, Pa.; Sec., S. E. SOLLY, Colorado Springs, Colo.

We received the following announcement, which we heartily endorse.—ED.

138 CLINTON STREET, BROOKLYN, N. Y.

DEAR DOCTOR:—It is the desire of the undersigned to bring out in the immediate future a "Review of the Work in Otology during 1897," on the plan of Blau's similar work in German. This "Review" will consist of a thorough résumé of the work published; conflicting opinions and deductions being placed in comparison; work involving new researches, new methods, and new ideas being treated *in extenso*. In other words, the desire is to make this work a review from the aurist's standpoint, containing the gist of the year's work in otology, and written in such manner that, in general, the reader will not find it necessary to refer back to the original article for explanation or amplification, as has invariably been necessary in the case of the reviews on otology published in English heretofore.

In order to bring out this work, it is necessary that a certain number of subscribers pledge themselves to purchase the book: the price has been fixed at five (5) dollars per copy.

Will you kindly sign enclosed blank and fill out slips and return as soon as possible to address given. Very truly yours,

H. A. ALDERTON.

Messrs. LEA BROTHERS & CO., Philadelphia and New York, announce for early publication:

A MANUAL OF OTOLOGY. By GORHAM BACON, A.M., M.D., Professor of Otology in University Medical College, New York. In one handsome 12mo volume, with numerous illustrations.

DISEASES OF THE NOSE, THROAT, NASO-PHARYNX, AND TRACHEA: A Manual for Students and Practitioners. By CORNELIUS G. COAKLEY, M.D., Professor of Laryngology in University Medical College, New York. In one volume, 12mo, of about 400 pages, with numerous illustrations, many of which are in colors.

BRITISH NOTES.

The ROYAL VICTORIA EYE AND EAR HOSPITAL, Dublin. Her Majesty the Queen has been graciously pleased to direct that the institution recently formed

under the Act of Parliament, which amalgamated ST. MARK'S OPHTHALMIC HOSPITAL, Lincoln-place, and the NATIONAL EYE AND EAR INFIRMARY, Molesworth St., shall be called the ROYAL VICTORIA EYE AND EAR HOSPITAL, Dublin.

BEQUESTS, ETC.

The late Mrs. ELLEN H. HARRIS has bequeathed £1,000, and the late Mr. JAMES BILLING £500 to the THROAT HOSPITAL, Golden Sqr.

The record collection in aid of the Cork Hospitals has amounted to £3,350, of which £400 has been allocated to the EAR, EYE, AND THROAT HOSPITAL, by the Executive Committee.

The late Mr. B. I. BARNATO bequeathed £1,000 to the JEWS' DEAF AND DUMB HOUSE.

HONORS AND APPOINTMENTS.

FELIX SEMON, Esq., M.D., late Laryngologist to ST. THOMAS'S HOSPITAL, and President of the Laryngological Society of London, has received the honor of Knighthood from Her Majesty the Queen. We beg to offer him our sincere congratulations.

CONNAL, J. G., M.B., M.S., Glasgow, has been appointed a physician to the Throat and Nose Department of the GLASGOW CENTRAL DISPENSARY.

LAKE, R., F.R.C.S., has been appointed Surgeon Laryngologist to the NORTH LONDON HOSPITAL FOR CONSUMPTION, Hampstead.

PAGET, STEPHEN, M.A., F.R.C.S., has been appointed Aural Surgeon, and Lecturer on Laryngology and Otology to the MIDDLESEX HOSPITAL, London.

KERR, J., M.A., M.D. Cantab., D.P.H., has been appointed Honorary Surgeon to the BRADFORD EYE AND EAR HOSPITAL, *vice* J. H. BELL, M.D., appointed Consulting Surgeon.

POTTER, E. FURNISS, M.D. (Brŭx), M.R.C.S., L.R.C.P., has been appointed Assistant Surgeon to the LONDON THROAT HOSPITAL.

WAGGETT, E., M.B., has been appointed Assistant Surgeon to the LONDON THROAT HOSPITAL.

LAKE, R., F.R.C.S., has been appointed Assistant Surgeon to the ROYAL EAR HOSPITAL, London.

YEARSLEY, MACLEOD, F.R.C.S., has been appointed Assistant Surgeon to the ROYAL EAR HOSPITAL, London.

THE ULSTER EYE, EAR, AND THROAT HOSPITAL.

A new wing has recently been opened at this Hospital. The extension comprises eight new private wards, new day-rooms, a new operating-room, new bath-rooms, etc.

BRITISH LARYNGOLOGICAL, RHINOLOGICAL, AND OTOLOGICAL ASSOCIATION.

The following are the office-bearers for the ensuing year: President, Dr. DUNDAS GRANT; Vice-Presidents, Mr. F. MARSH, Mr. G. C. WILKIN, Dr. J. DAVISON; Council, Dr. W. MILLIGAN, Dr. A. B. KELLY, Mr. WYATT WINGRAVE, Dr. WM. HILL, Mr. P. JAKINS, Dr. H. WOODS, Mr. R. LAKE; Hon. Treasurer, Dr. MACNEIL WHISTLER; Hon. Secs., Mr. ST. GEORGE REID, Dr. F. POTTER.

We notice that *The Laryngoscope*, which has met with apparently rapid success in America, is to be issued in Great Britain with the co-operation of Dr. ST. CLAIR THOMSON, Surgeon to the ROYAL EAR HOSPITAL, London, and other associate editors and contributors in different parts of the world whose names guarantee good work. The special aim of the paper is to supply interesting matter on the subjects of Diseases of the Nose, Throat, and Ear to General Practitioners, who are becoming more aware of the importance which these subjects possess. The first joint number will appear in January, 1898. It will be issued monthly, the price being one shilling per month, or ten shillings per annum, post free, prepaid. We welcome *The Laryngoscope* and wish it every success.

Contents of the Latest Number of the Zeitschrift für Ohrenheilkunde.

Vol. XXXII., No. 3. Issued March, 1898.

18. Prof. PASSOW, Heidelberg. On the retro-auricular opening after the radical operation of chronic middle-ear suppuration (illustrated).

19. OLE BULL, Christiania. Lipoma of external ear canal.

20. H. PREYSING. Otitic and rhinitic sinus and general affections. Further, on central deafness in intracranial purulent inflammations. (From the Rostock Ear and Throat Clinic.)

21. F. VOSS, Riga (Russia). A new symptom in obstructing thrombosis of the lateral sinus.

22. STAN. VON STEIN, Moscow. A case of epidemic cerebro-spinal meningitis with bilateral otitis. Trephining of both lateral sinuses. Recovery.

Reports on the Austrian and Paris Otological Societies. Reviews.

Obituary (Prof. W. Moldenhauer, Leipzig).

Reviews.

Report on the Fourth Quarter of 1898.

Vol. XXXII., No. 4. Issued April, 1898.

23. FR. BEZOLD, Munich. Statistical report of the years 1893–1896.

24. J. E. SHEPPARD, Brooklyn. Three fatal cases of otitic brain-disease. (Translation from the Engl. ed.)

25. H. TREYSING, Rostock Clinic. Multiple tumors of skull and both drum-membranes.

26. THOS. BARR, Glasgow. Case of cerebellar abscess, etc. (Translated from the Engl. ed., year 1897, p. 241.)

Book Review (of *Jacobson's Text-Book*).

edies, and instruments, and to discuss in a progressive, yet conservative spirit all questions of present importance.

The ARCHIVES contain exclusively original papers on all branches of Ophthalmic and Aural Surgery, and original reports on the progress of Ophthalmology and Otology throughout the world. The original papers occupy about three-fourths of the space, and their scope embraces all subjects of scientific and practical interest in the departments of Ophthalmology and Otology.

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Under the heading of "Miscellaneous Notes" there will be published all kinds of professional news that concerns the Oculist and Aurist, *e.g.*, appointments, honors, resignations and vacancies, new ophthalmic and aural hospitals, prize questions and essays, announcements of Society meetings, etc.

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Original papers of value from any source are solicited.

Communications for the English edition of the ARCHIVES OF OPHTHALMOLOGY should be addressed to DR. H. KNAPP, 26 West 40th Street, New York, those for the ARCHIVES OF OTOLOGY either to DR. H. KNAPP, or to DR. U. PRITCHARD, 26 Wimpole Street, W., London, England.

G. P. PUTNAM'S SONS, Publishers

NEW YORK
27 & 29 WEST 23D STREET.

LONDON
24 BEDFORD ST., STRAND.

PUBLISHER OF THE GERMAN EDITION

I. F. BERGMANN

20 Schwalbacher Strasse, Wiesbaden.

EDITORIAL NOTE.

In asking for continued support of the ARCHIVES from subscribers and contributors, the Editors offer no new program, but point to the record of the work that has been accomplished during the past twenty-eight years. At the first appearance of the ARCHIVES in 1869, they constituted the only periodical of their class in America, and had only a few predecessors in Europe. The international character of the ARCHIVES was a novel and distinctive feature.

The original program of the ARCHIVES to publish only original papers in semi-annual independent numbers has, in the course of years, been extended by the addition of reviews of the current ophthalmological and otological literature.

With the eighth volume, in 1879, the combined ARCHIVES, issued semi-annually, were divided into two separate journals, issued quarterly, and each of about the same size as the combined journal, and the reviews were converted into quarterly reports, systematic and comprehensive, though concise, on the progress of ophthalmology and otology.

Since that date, the ARCHIVES have developed into an extensive and conveniently arranged storehouse of knowledge for the instruction of the student and for reference by the practitioner and the investigator.

For more than ten years, the valuable material offered to the ARCHIVES has been so abundant that it has not been practicable to utilize for the English edition the full series of papers from the German, or the converse. Many articles had to be abridged, while of others abstracts only could be printed. Any one of our readers could, however, have secured, and can secure in future, from the American editor, or the German publisher, the loan of the original papers presenting the complete text.

It is the purpose of the editors to arrange, in the department of Reports, for the review of every publication which in their opinion contains material that can be called distinctive and important. It is, of course, impossible, within the limits of the ARCHIVES or of any similar journal, to give attention to every publication in their department of science. We may state further that it is not a part of our program to furnish a complete report on the *bibliography*, but only on the **progress** of ophthalmology and otology.

Though the systematic arrangement of the reviews is of importance for reference and comprehensive information, we shall publish, as early after the meetings as practicable, reports of the proceedings of societies, always bearing in mind that the ARCHIVES are not intended to be only a repertory of knowledge, but also a journal of news.

It is natural that the English edition of the ARCHIVES should give the advantage of time and space to Anglo-American contributors over the German, and *vice versa*. It is evident, however, that the association of the two editions lends strength to each, furnishing to the authors a wider circulation for their papers, and to the readers a larger and more diversified field of information.

NOTICE TO CONTRIBUTORS.

The editors and publishers of the ARCHIVES beg to offer some suggestions to authors who propose to favor them with their contributions.

1. As original communications the ARCHIVES can accept only such papers as have never been printed nor are intended to be printed in other journals. If a preliminary communication on the subject of a paper has been published, the author is requested to state this in the letter accompanying his manuscript. It is understood that contributors to these ARCHIVES and editors of other periodicals will make no abstracts of the original papers published in this journal without giving it due credit for the same.

2. Authors will receive gratuitously twenty-five reprints of their articles. If a greater number is desired,—notice of which should be given at the head of the manuscript,—only the additional cost of presswork and paper will be charged to the author.

3. In preparing manuscript for the compositor it is requested that the following rules be adhered to:

a. Write on one side of the paper only.

b. Write without breaks, *i. e.* do not begin a new sentence on a new line. When you want to begin a new line or paragraph at a given word, place before it in your MS. the sign ¶.

c. Draw a line along the margin of such paragraphs as should be printed in smaller type—for instance, all that is clinical history in reports of cases, etc.

d. Words to be printed in *italics*, should be underscored once, in SMALL CAPITALS twice, in LARGE CAPITALS three times.

4. Authors may receive proofs for revision if they will kindly return them without delay. We beg however to remind our contributors that changes in the copy are equivalent to resetting, causing so much additional expense. We therefore request them, to make, if possible, no alterations at all in their MSS., or, at least, to limit these to what is of essential importance.

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ARCHIVES OF OTOLOGY.

THREE CASES OF INTRACRANIAL ABSCESS: THE FIRST TWO CEREBELLAR AND FATAL (AUTOPSIES); THE THIRD SUBDURAL (RECOVERY); WITH REMARKS.[1]

By JAMES F. McKERNON, M.D.,

ATTENDING AURAL SURGEON, N. Y. EYE AND EAR INFIRMARY.

CASE I.—**Abscess of Cerebellum, Complicated by Thrombosis of the Lateral Sinus and Mastoiditis, Resulting from Suppurative Inflammation of the Middle Ear—Operation—Death.**

AS this case has already been reported in full in the Transactions of the New York Eye and Ear Infirmary, for the year 1897, I will here give but a brief résumé, dwelling particularly upon those points which seem to me to be of special interest in this class of cases.

M. L., female, age seventeen years, native of the United States, applied at my service for treatment March 10, 1897, giving the following history. She stated there had been a discharge from both ears, at frequent intervals, for the past eleven years, particularly upon taking cold, and for the past four years she had suffered from violent headaches on the right side, especially at the base of the skull.

Ten days before she presented herself at the clinic she had experienced a slight pain in the right ear, lasting for half a day, when the ear began to discharge and the pain ceased. For the next six days the right ear discharged freely, then the discharge lessened and the pain commenced again; this pain had lasted steadily for the past four days, with headache over the right side and pain behind the ear. Her temperature was 100.4°, pulse 108.

[1] Read before the American Laryngological, Rhinological, and Otological Society at its fourth annual meeting at Pittsburg, Pa., May 12, 1898.

Upon inspection of the ears, a slight watery discharge was seen coming from the canal of the right side. There was absence of the drum membrane, except a small portion in the posterior superior quadrant, which was bulging. A large amount of granulation tissue was present, and this was covered with gray-colored muco-pus. Pressure over the right mastoid caused considerable pain, especially over the upper third. The left ear showed nothing wrong in particular, except the remains of an old residual purulent inflammation, there being no tenderness on that side.

The patient was advised to enter the hospital, and have an ice coil applied, but this she refused to do. Incision was made in the remaining portion of the drum membrane and a few drops of pus were evacuated. Leeches were applied over the mastoid and she was given instructions to syringe the canal every three hours with a solution of bichloride, 1 : 3000, and report at the hospital the day following.

Two days later she returned, still suffering from pain in the right ear, over the right mastoid, and the right side of the head, the discharge now having almost entirely ceased. She now consented to remain in the hospital. An ice coil was applied over the right mastoid, and irrigation of the canal was kept up with bichloride every three hours, and a calomel purge, followed by a saline, was given with good results. The coil was kept on until noon of the following day, when it was removed, and the slightest pressure over the mastoid caused the patient to cry out with pain. The discharge from the canal had entirely ceased, but she complained of very severe pain over the right side of the head. Her temperature was now 101.2°, pulse 102.

The *operation of opening the mastoid* was now advised and accepted, as she said she could not possibly bear any more pain. She was etherized and the usual mastoid incision made; upon retracting the soft tissues, the mastoid presented an irregular outline, rather narrow, with color white and glistening. The antrum was opened and found to contain a few drops of pus and a small mass of granulation tissue. The situation of the antrum was very high up, and in entering it a small chip of bone was removed above, exposing the middle fossa. Granulation tissue was also found in the tympanic cavity and removed with the curette. The mastoid throughout its whole extent was removed and found to be dense and hard as ivory; the pneumatic spaces were completely obliterated and filled in by dense bone tissue; the sinus was not

exposed. The usual dressing was applied and the patient taken to the ward.

The next day the patient still complained of pain over the right side of the head and in the wound region; her temperature was 102°, pulse 114.

For the next four days she complained of headache on the right side and did not rest well at night, always saying that the pain was as bad as before the operation; during this time the temperature ranged from 99° to 102°, pulse never above 108 per minute.

On the 17th, five days after the operation, the dressing was removed and the wound inspected. The mastoid area did not look healthy, and there was a slight tendency to slough at the lower angle of the wound. The wound was cleansed and a dressing reapplied. That night the patient complained so much of pain in the wound and headache that it was necessary to give her an opiate, to get even an hour's rest.

The next day pain continued with a gradual rise in temperature to 104°, and Dr. Dench was asked to see her in consultation. The dressing was removed from the mastoid, which presented a grayish look over its entirety, and upon palpating with a probe softened bone tissue was found over the central portion of the lateral sinus; at one point, just below the centre, the probe passed through this softened bone and entered the sinus, and upon being withdrawn was not followed by any flow of blood.

A second operation was decided upon, the patient etherized, and, with the assistance of Dr. Dench, the upper portion of the sinus was exposed for about one inch. The bone over it was very soft and carious, and the sinus was found collapsed; the dura over this upper portion was incised and a large amount of dark-colored pus and granulation tissue were removed, the curette was used freely, and circulation restored above. This was controlled by packing iodoform gauze against the sinus. The lower portion of the sinus was now uncovered as far as the jugular bulb. The bone covering this part was exceedingly thick, its cancellous structure being carious. The dura over this portion of the sinus was opened as far down as the bulb, and pus and granulation tissue similar to that found in the upper part were removed; the sinus was curetted, and a free hemorrhage took place from below, which was controlled by packing iodoform gauze firmly into the lumen of the vessel. It was noticed, while operating, that the

posterior dural wall of the lower half of the sinus was somewhat thickened.

The patient rallied poorly from the ether and required active stimulation for four hours afterward. The next day she complained of severe headache, saying she could not possibly stand the pain; she vomited a yellowish fluid at four different times during the day. Her temperature was 103.5°, pulse 122. Upon the nurse's report that no urine had been passed that afternoon, the catheter was used, twelve ounces were drawn, and upon being examined was found to contain nearly 2 per cent. of albumen. At six o'clock that evening she become very restless, delirious, tried to get out of bed, and was unable to answer questions. Her temperature was now 105°, pulse 154, respiration 38. The dressing was removed, and free hemorrhage took place from the sinus; this was controlled by packing with gauze as before.

The posterior dural wall of the lower half of the sinus, which was noticed thickened at the second operation, showed a slight fulness. The dura over this point was opened and a grooved director was introduced downward, backward into the cerebellum for about two inches, and, upon withdrawing it, was followed by a discharge of about an ounce of foul-smelling pus, together with disorganized brain tissue.

The opening into the cerebellum was now enlarged sufficiently to admit the finger, which, passed downward and inward, was followed by a still further discharge of pus of a very offensive odor. The cavity was sponged with gauze as gently as possible, packed loosely with iodoform gauze, and a dressing quickly applied; as the patient's condition was very weak, active stimulation with strychnia, digitalis, and whiskey was needed to rally her.

After three hours she roused somewhat, and could speak, and took liquid beef peptonoids for nourishment at frequent intervals during the next six hours.

At three P.M., twelve ounces of urine were drawn, and upon examination showed a larger quantity of albumen present than the specimen examined eight hours previous. During the early part of the following day she was conscious and took nourishment, her temperature at no time since the evacuation of the abscess falling below 104°, with pulse 140.

Since the time that albumen was discovered in the urine, counter-irritation over the kidneys was used, followed by digitalis poultices, which were kept up continuously, and a diuretic was given internally.

At five P.M. the wound was dressed again, and upon removing the gauze from the abscess cavity, a brownish, purulent fluid escaped, together with more disorganized brain tissue. The cavity was cleansed with small strips of sterile gauze, soaked in a normal salt solution, and loosely packed as before with iodoform gauze. During this dressing the patient complained of very little pain. For the next four hours she was conscious and said she felt better. Her pulse and respiration were better and she continued taking nourishment. The next morning she became very restless, and finally passed into complete coma. Saline solutions were retained by the rectum for a few hours. The poultices were continued over the kidneys, but no urine could be obtained by catheter, and she gradually became weaker. Active hypodermic stimulation was used, and at the end of three hours, four ounces of urine were drawn and found to contain a very large amount of albumen and many casts. Coma continued during the night and the patient died next morning at eleven o'clock. Just before death the temperature reached 107.4°.

Previous to the evacuation of the abscess, the eyes were examined by Dr. C. S. Bull, the result being negative.

Upon *autopsy*, no ante-mortem clot was found in any sinus of the dura, or any other intracranial involvement, except the two here mentioned.

I wish to call attention to the very dense and firm condition of the mastoid, the absence of pneumatic spaces, and the thickened condition in its entirety of the mastoid tissue. Bacon [1] lays particular stress upon this point in his report of brain-abscess cases, saying that when the mastoid is found firm and dense upon operation, and the symptoms still continue, he believes we are justified in further exploration of the cranial cavity, and that by so doing we shall many times discover the seat of the trouble, where otherwise it would be passed over.

Also attention is to be drawn to the fact of the bone being found carious over the sinus five days after the first operation, as this bone was dense, hard, and firm when first exposed, and infection must have come from within, working outward after the sinus became involved.

When a septic thrombus is present we should expect a

[1] *New York Eye and Ear Infirmary Reports*, 1897.

chill and a sudden rise of temperature, with a spontaneous fall where septic material enters the sinus, but here the rise was gradual, and remained so until after the second operation. In this case, I believe that, primarily, the abscess of the cerebellum was the result of infection from the purulent inflammation existing in the middle ear, and was transmitted to the cerebellum through the medium of the pneumatic mastoid spaces and their venous communications previous to the mastoid becoming sclerosed, and that this focus of pus in the cerebellum was slow in its advancement, taking, in all probability, months or years (as would be safe to infer from the history of the case) to reach the state in which it was found.

CASE 2.—**Abscess of Cerebellum, Complicating Chronic Purulent Otitis Media with Thrombosis of Lateral Sinus—Death from Chronic Nephritis.**

W. J., aged twenty-five years, a native of the United States, by trade an electrician, was admitted to my service at the New York Eye and Ear Infirmary, June 12, 1897, giving the following history :

He had been in poor health, though able to work, for the past two years. For several years past (no definite time could be remembered) he had been troubled with a discharge from both ears, with occasional attacks of pain. When the pain was most severe the discharge would be scanty or cease altogether, only to appear again when the ear broke and began running.

Two weeks before his admission, he said, there was a severe pain at night, in the right ear, which lessened the next day when the ear began to discharge a thin white-colored fluid. For the next week he had pain in this ear occasionally at night. On the twelfth day after the pain began the discharge stopped, and was followed by a severe pain in the ear, and two days later the pain was felt behind the ear and had continued steady up to the time he was seen. He said for the past eight days he had had no sleep, not so much on account of the earache, because he was accustomed to that, but on account of a severe pain low down in the back of his head on the right side. This pain, he said, had continued uninterrupted for eight days, and seemed to be getting worse each day.

Upon examination he was found markedly anæmic and emaci-

ated, having lost, he said, some twenty pounds in weight during the past four months. The skin appeared pallid, and he was very weak, being scarcely able to walk without assistance.

Upon inspection, a scanty discharge of gray pus, with a pronounced odor, was seen coming from the right external auditory canal. The superior and anterior walls of the canal were protruding into the lumen of the tube, shutting off a view of the parts beyond. Over the right mastoid was a boggy, œdematous swelling, extending well down toward the tip. Upon the left side a profuse discharge of greenish pus was coming from the external auditory meatus. This was cleansed away. An inspection of the deeper structures showed absence of the drum membrane, and a probe, passed directly along the posterior and inner walls of the tympanum, encountered dead bone in several places. There was no mastoid tenderness on this side. The temperature was taken and found to be only 98.2° F.

The patient was informed of his serious condition and advised to have an operation at once. He readily consented, saying the pain was unbearable, and nothing could be worse than that. He was sent to the ward to be prepared for the operation, an order being given to have a specimen of the urine examined before he was taken to the operating-room. This was done by the house surgeon, who reported, in a short time, that the specific gravity of the urine was 1010 and contained one third of albumen by bulk. The patient was told of this kidney condition and the probable gravity of it, but he still insisted that something must be done to relieve the pain of the head.

He was taken to the operating-room, chloroform was administered, and the usual mastoid incision made, extending from the tip below, half an inch posterior to the attachment of the auricle, to a point corresponding to the upper border of the zygoma above. This incision extended through the soft part and periosteum down to the bone. The periosteum was easily separated from the bone, and this with the soft part was retracted, exposing a dark, mottled mastoid cortex. The bone was soft and necrosed throughout its entire external table. The antrum was easily entered and freed of a thick creamy pus. The mastoid cells were all broken down, and pus passed freely from one to the other. This formed a large cavity, filled with pus, decaying bone substance, and granulation tissue. All of this was thoroughly removed by the curette.

The necrotic bone extended well backward over the sigmoid

sinus and down to the tip. All of this was thoroughly removed by the rongeur and curette, and in doing so one and a quarter inches of the lower portion of the sigmoid sinus was uncovered from the bend downward. A portion of the dural wall covering this part of the sinus was covered with granulation tissue. This was gently removed with the curette and thumb forceps. The uncovered portion of the sinus did not appear over-prominent, and no pulsation of the dural wall covering it was discovered when the finger was laid upon it. The sinus was aspirated and fluid blood drawn into the syringe, showing that the lumen of the vessel was free from any clot. A small tampon of iodoform gauze was placed over the point of aspiration, the surface cleansed, and the wound packed and dressed in the usual manner. The patient was returned to the ward, the time of the operation consuming forty-seven minutes. During the operation he was stimulated twice hypodermatically, $\frac{1}{20}$ of a grain of the sulphate of strychnine being given each time. He rallied well from the operation, his pulse stronger now than before, but as soon as he became conscious, which was in half an hour after leaving the operating-room, he began complaining of pain at the base of the skull on the right side of the head.

At eleven o'clock that night he slept for twenty minutes, and upon awakening was very restless and complained of nausea, but did not vomit. His temperature was now 102° F. Eight ounces of urine were drawn, and upon examination found to contain about the same quantity of albumen as the specimen previously examined. The microscopical examination showed it to contain abundance of hyaline and granular casts, with plenty of pus cells and epithelium. Hot packs and poultices were applied over the kidneys in the lumbar region, and rectal enemas of a warm, normal salt solution were used every three or four hours, and internally was given the infusion of digitalis, half an ounce every three hours.

The kidneys responded to this treatment, and he passed urine twice during the night and three times the following day, the smallest quantity passed at one time being three ounces and the largest nine ounces. These specimens all contained a large percentage of albumen.

The noon temperature, the day following the operation, registered 102.8° F., pulse 124. During the afternoon he was exceedingly restless, nauseated, and kept complaining of pain in the

wound region and low down on the right side of the occiput. At five o'clock his temperature rose to 103.4° F., pulse 138 and weak, respirations down to 16 per minute and shallow. He seemed drowsy and no longer complained of pain. The eyes were examined, with negative result. The dressing over the wound was now removed, and that portion of the dural wall covering the exposed sinus was found bulging into the mastoid wound. The patient was stimulated with strychnine and whiskey, and taken to the operating-room and chloroform again administered. The sinus was rapidly uncovered to the jugular bulb below, and above as far back as the torcular, and opened from end to end of this area, evacuating a quantity of pus, clotted blood, and granulation tissue. Free hemorrhage was established below, and was easily controlled by packing iodoform gauze into the bulb.

After persistent use of the curette and probe, the blood stream was established above, and let flow for a few seconds to wash away any septic material that might remain in the vessel. The hemorrhage here was controlled as below, by packing with iodoform gauze against, but not into, the lumen of the vessel.

After controlling the hemorrhage above and below from the sinus, it was noticed that the dura of the posterior sinal wall, corresponding to the lower half of the sinus, was bulging outward, similar to that of the sinus before it was opened. A slit in the dura, with a knife, at its most prominent part, was made, and a grooved director passed downward, backward, and inward into the right lobe of the cerebellum for about two inches, and upon being withdrawn was followed by a little oozing of foul-smelling pus. This opening was now enlarged with the finger, and was at once followed by a flow of about two ounces of pus, grayish in color, and with an exceedingly foul odor. This pus was quickly mopped out with strips of gauze soaked in a normal saline solution, and the cerebellar cavity loosely packed with iodoform gauze; a dressing was applied over the whole surface, and the patient quickly taken to the ward, placed in bed, and the foot of the bed elevated; active hypodermatic stimulation of whiskey and strychnine, and a warm saline enema in the rectum, were given, and the body surrounded by hot-water bags and hot bottles.

Under this treatment he regained consciousness, said he felt better, and had no pain. His temperature was now, one hour after the second operation, 101.4° F., pulse 140, character weak. The time of the second operation was thirty-eight minutes.

At ten o'clock that evening he said he felt fairly comfortable, except a pain in his back and legs. His temperature was 102.3° F., pulse 148, still weak. The hot applications over the kidneys were renewed and kept up, and at 2 A.M. three ounces of urine were drawn, containing a still larger quantity of albumen by bulk than any of the previous specimens. During the morning hours of this day he took a small quantity of liquid nourishment, asked for water, was rational, and did not complain of any pain.

In the afternoon he became restless, somewhat irritable, and tried to get out of bed and go home. Later he became stupid, passed into a state of coma, and died at six o'clock that evening. Just a moment previous to the death, the nurse records that he had a slight convulsion.

I will not trespass upon your time by giving the full *autopsy* notes, except to say that no further evidence of any intracranial involvement was found. The kidneys were both in an advanced state of parenchymatous nephritis.

The features of particular interest to the writer in this case are:

1. The fact that the severe occipital pain was in no way relieved by the first operation, showing, as later events proved, that the cause of this pain had not been removed, for after the second operation and the evacuation of the pus from the sinus and cerebellar cavity, when he regained consciousness, which he did in half an hour, he said all pain had disappeared, and while consciousness lasted he did not again complain of this pain, although asked repeatedly if it were present. This shows, I believe, that in the cases which are not relieved of pain by the opening of the mastoid we should go still farther, without too much delay, and explore the cranial cavity thoroughly in order to determine the cause, if possible, of the pain. In doing this, it can be accomplished with less injury to the cerebral substance, if, instead of using the aspirator, we use a grooved director; for, if pus be present and thick, it will not pass through the ordinary aspirating needle used for this work. The director can be passed into the brain in several directions if necessary, and the slight hemorrhage resulting will do no harm, and if a pus sac be found, even though thick, the pus will follow the director to the surface.

2. We expect in septic sinus thrombosis a rigor and a sudden rise of temperature, with a remission. This did not occur here, as the temperature taken every two hours only showed an increase of scarcely one degree F., and this gradual in its rise. Also attention is to be drawn to the absence of any pulsation in the sinus when it was exposed at the first operation, as many writers have said when pulsation is not present the vessel contains a clot. I think this is of little or no value in determining the condition of the blood current, as the pulsation when present, I believe, is due to the impulse transmitted to the sinus from the brain substance lying adjacent to it.

We are told by Starr,[1] that the symptoms of brain abscess can be quite distinctly divided into three stages. This may be true, but in brain abscess caused by a purulent otitis we may have complications, such as sinus thrombosis, meningeal inflammation, epidural abscess, etc., causing an increase in symptoms that are misleading; as, for instance, we look for a low temperature in abscess, but where pyæmic sinus thrombosis exists we usually get a high temperature with a sudden remission, these being usually preceded by one or more rigors, so that the symptom of temperature cannot be relied upon. Again, it is much easier to diagnose an abscess of the brain, the result of traumatism, than middle-ear trouble. The indications justifying or calling for an exploration of the cranial cavity where an abscess is suspected in relation to ear diseases are, I believe, as follows:

1. That a chronic otorrhœa is, or has been, present.
2. Persistent headache, general and localized.
3. Restlessness and irritability of temper.
4. Tenderness of the affected side to percussion.
5. Nausea, vomiting, and vertigo.
6. An almost persistently low temperature.
7. A slow pulse, later stupor. Optic neuritis may or may not be present; when present, it may aid us very materially in arriving at a diagnosis, as may also aphasia and motor disturbances. In my own cases these were absent.

Of these symptoms, I believe the one to which the most

[1] *N. Y. Eye and Ear Infirmary Reports*, 1897.

importance should be attached is severe and persistent head pain.

In 1895, Koerner reported ninety-two cases of brain abscess operated upon, with fifty-one recoveries. Since that time there have been a number of successful cases, both in this country and abroad, operated upon. He also says it occurs oftener on the right side than the left. The cases here reported would seem to bear this out, as all were on the right side.

The use of the chisel, gouge, and rongeur seems to me to be a more rapid method of entering the skull than the use of the trephine.

CASE 3.—**Acute Mastoiditis, with Subdural Abscess Following an Attack of Acute Otitis Media—Operation—Recovery.**

P. S., an Italian, aged thirty years, was admitted to my service at the New York Eye and Ear Infirmary, March 4, 1898, with history as follows:

Had always been in good health except an attack of the grip six years before, when he was sick for one week, but stated distinctly he had no aural trouble at that time, or at any time previously.

Five weeks before, he contracted a severe cold and suffered from sore throat for two days. On the third day he experienced pain in the right ear, which lasted continuously for five days. During this period he was unable to sleep night or day, and the night of the fifth day, after a severe paroxysm of pain, the ear began to discharge and the pain was relieved. He said the discharge was thick, did not have any odor, and was very profuse.

Four days later the pain commenced again in the right ear, and two days after this, was followed by pain and tenderness over the mastoid of the right side. Pain was also very pronounced over the right temple and radiated backward over the side of the head to the occiput.

During this entire period he was under the care of a physician who pursued the usual treatment in these cases, namely, syringing the ear, and later, leeching the mastoid, etc.

Upon physical examination there was a marked anæmic condition present, with a characteristic septic pallor of the skin. The tongue was heavily furred and pulse about 100 per minute. A physician who accompanied him to the clinic said his temperature that morning was nearly 102° F.

Inspection of the ears showed a profuse purulent discharge yellow in color, coming from the external auditory meatus of the

right side. Upon placing a speculum in the meatus, the superior and posterior walls were seen collapsed and bulging into the canal. At the lower and anterior part of the drum membrane could be seen a mass looking like granulation tissue. The mastoid over its whole area was exquisitely tender upon pressure. This tenderness to pressure extended above the zygoma and also in front of the superior attachment of the auricle.

An operation was advised and accepted. The patient was prepared, ether administered, and the usual mastoid incision made, extending through the soft parts and periosteum to the bone. The periosteum and soft parts were retracted, showing the cortex dark in color and mottled in its appearance. The first stroke of the chisel over the antrum caused pus to well up in the opening. This pus was of a dark gray color, with but little odor. The antrum was curetted, and the whole outer table, which was necrotic, was removed. The whole of the posterior canal wall was removed as well as the tip. In fact, the whole apophysis was easily separated from the inner table, leaving nothing below except the muscular tissue beneath the tip. The necrosed bone extended back beyond the sinus for nearly an inch and the sinus was exposed for one and a half inches downward toward the bulb from its bend. Granulation tissue was removed from this area over the sinus. The whole of the cavity was cleansed and communication established with the middle ear through the aditus.

In using the probe to palpate for softened bone, it entered readily that portion of the bony wall separating the antrum from the middle cerebral fossa. This softened bone was removed with the curette over an area of nearly an inch, exposing the dura, which looked very much darker than normal.

The dura was opened at this point, a grooved director was passed upward and forward between the dura and brain in the middle fossa. Upon being withdrawn it was followed by a discharge of pus from beneath the dura. The opening was enlarged sufficiently to admit of the passage of the finger, and the cavity emptied of about four drachms of gray-colored pus, with but little odor.

The probe was passed in various directions, but encountered adhesions all around the abscess cavity, showing that nature had walled off the pus and prevented its spread.

There was still some softened bone found near the junction of the superior and posterior canal walls, and in removing this, upward and forward, an opening was found through the vault of the

tympanum, showing where perforation had taken place. A bent probe was easily passed from here directly into the subdural abscess cavity of the middle fossa.

The cavity was syringed with a solution of bichloride 1:10,000 and packed loosely with iodoform gauze. A separate piece of gauze was passed into the tympanum at the point of perforation and the other end carried against the dural opening of the middle fossa.

As the dura over the sinus was dark in color and covered with granulation tissue, it was thought best to aspirate it, even though distinct pulsation was present. The needle drew fluid blood from the sinus twice, showing the current was normal within. There was quite an active hemorrhage where the second puncture of the needle was made, but it was controlled by packing gauze against it.

The usual dressing was applied and the patient taken to the ward. The operation lasted fifty-one minutes and he required stimulation three times. $\frac{1}{20}$th of a grain of strychnia was given hypodermatically twice and later a drachm of whiskey in the same manner. The patient rallied nicely from the operation, and at eight P.M. his temperature was 99°, pulse 104. Six hours later his temperature was 102°, but he said he felt comfortable and free from pain.

At eleven o'clock in the morning of the day following the operation he had a sudden chill and complained of severe headache, sore throat, and pain in the back of the neck and throughout the body, and his temperature rose to 103.2° F. The throat was examined, and he was found to be suffering from an acute follicular amygdalitis. This, under treatment, subsided in a few hours and the temperature gradually became lower each day until, on the eighth day after the operation, it touched normal.

The first dressing was removed seven days after the operation and the parts found healthy, save a stitch-hole abscess in the upper angle of the wound.

From this time on he was allowed to sit up each day. The wound was dressed every other day, and he was discharged from the ward service sixteen days from the date of the operation, returning to the clinic three times a week for treatment.

The one principal point for emphasis in this case is,—that here we have a very extensive mastoid involvement, together with a subdural accumulation of pus, the result of acute otitis media of only five weeks' standing.

ON THE RETRO-AURICULAR OPENING AFTER THE RADICAL OPERATION FOR CHRONIC MIDDLE-EAR SUPPURATION.

By Prof. PASSOW, of Heidelberg.

(*With five sketches in the text and nine figures on Plates I. and II. of Vol. XXXII., German Edition.*)

Translated by Dr. J. A. Spalding, Portland, Me.

WE are all united in the opinion that the radical operation for the cure of chronic middle-ear suppuration is very valuable, but we differ concerning its indications and the method of performing it. The purpose of this essay is to discuss the retro-auricular opening, and the plastic operations by which it is closed.

Before reaching the latter I will speak briefly about the operation itself, so far as it is connected with the immediate topic of my paper.

In regard to the indications for the radical operation I agree with Trautmann and Stacke,[1] making the attempt to cure a case by preliminary extraction of the hammer and anvil only when the chances are favorable, or when the operation can be easily done without narcosis. We must not forget that many who depend for their living on manual labor lose valuable time if we operate unsuccessfully on the ossicles, and are later compelled to resort to the radical operation.

The method of operating seems to me unimportant. Our aim should be to make a large cavity embracing the middle-

[1] Stacke, *Die Operative Freilegung der Mittelohrräume*, 1897, p. 29.

ear spaces, removing diseased and suspicious bone, and cleansing all niches and pockets. My first aim is to reach the antrum, and from there on, one method is as difficult as the other. I use a straight chisel, strong forceps, a sharp spoon, and a gouge. The hole should be large, and I take sound bone rather than run the risk of leaving diseased bone behind. Facial paralysis I have seen but once from the operation, and its permanency was not proved, as the patient died from tuberculosis.

Siebenmann's suggestion to spare the matrix in cholesteatoma I am unable to accept. It should be freely removed.

A large number of authorities[1] close the retro-auricular opening by primary suture independent of the nature of the disease, others[2] leave it open; some only in cases of cholesteatoma, and others only with extensive disturbances in the mastoid. Of those who leave the opening patent, some close it later, either during recovery, or long after the cavity has become covered with skin.

Starting from the functional results, the ideal aim of the operation should be to cure the suppuration by covering the entire region with skin, and without any disfiguring scar. The method which most surely and most rapidly reaches this goal is to be preferred.

When we use a primary suture all traces of the operation disappear. The same happens after secondary closure. A persistent opening behind the ear is a disfigurement indeed. Nevertheless we must abandon primary closure if by following it we sacrifice safety. We must make the opening permanent if thus alone we can guard against relapses and danger. If we agree with Schwartze's views of cholesteatoma we must, in cases of this sort, maintain a permanent fistula even though covered with skin.

The cicatrization of the hole in the bone and the time required for recovery depend on various circumstances. The more carefully the operation is done, and the more gentle

[1] Panse, *Klin. Vort. a. d. Gebiet. d. Ohrenhlkde*, Band ii., Heft 4; Hartmann, *Die Krankheiten d. Ohres*, 1897; Noltenius, *Deutsch. Ot. Ges.*, 1897, p. 146; Zaufal, *ib.*, p. 159; Grünwald, *Deutsch. med. Wochensch.*, 1895, No. 47.

[2] Trautmann, Jansen, Siebenmann.

the after-treatment is, the better the results. There are cases which last for months, and a few in which a cure is never attained. No operator escapes occasional ill-fortune.

We cannot predict the course which any case will take, no matter whether cholesteatoma or other disease. The patient's constitution makes a difference, whilst the anatomical relations, the nature of the disease, and its extent are to be considered. A certain case seems most favorable, and we give a good prognosis, but luxuriant granulations, proliferation of bone, and secretion from the tube shatter our hopes. Again, recovery follows where least expected. We lay aside our instruments dissatisfied, we have left an unwelcome niche; but for all that, the opening heals smoothly. I have often been amazed at the results in phthisical patients on whom I had operated most reluctantly. I now recall a young man who died from intestinal tuberculosis, but despite his rapid decline the opening in the bone healed without disturbance.

The after-treatment is important. Every day is a critical one, says Stacke. We must keep the wound under absolute control up to the day of recovery. The earlier we discover adhesions, granulations, or caries, the better we can get rid of them.

Granting that the retro-auricular opening is only a makeshift, its opponents must acknowledge that it simplifies the after-treatment. Every spot is open to tamponage, niches large or small are easy to see, secondary operations are easy to do; so free a view into the cavity cannot be obtained by any operations with the primary suture, and in Koerner's operation we need a speculum whenever the dressings are changed. Such a saving of time in a large clinique is important where we wish to give time enough for a careful dressing, yet be sure that all is going on well. If in case of a primary suture the introitus is not enlarged and the meatus only split backward, and later tamponed upward and downward, we finally get a pocket which hides the condition more or less.

Panse's operation permits us to see the promontory and facial ridge and in most cases the posterior portion of the

bone cavity, but how the latter is possible in extensive destruction of the mastoid I cannot understand. He remarks that the region about the tube is often hidden, but that this is not important, an assertion with which I cannot agree.[1] Koerner's operation, which he does not recommend with a narrow meatus and a large cholesteatoma, gives us a far better view of the operative field.

I have never seen patients operated by Koerner himself, but in others operated by his method a permanent deformity resulted. Some patients also complained that the dressing either fell completely out of the ear, or slipped into the bony cavity. Inasmuch as a portion of the surface of the cavity is covered with a flap from the meatus and the concha, the disadvantage, clinging to all methods with primary sutures, of requiring skin-grafts or pedunculated flaps, is by this method partly obviated. It has also found many supporters, but it keeps up the danger attendant on all radical operations, that the recovery may not be smooth. Even luxuriant granulations are not easily dealt with in a closed retro-auricular opening, and if at a later date the hidden bone becomes affected the cicatrix must unavoidably be reopened.

It is not my experience that patients complain more by changing the dressing from the meatus than from a retro-auricular opening. It is only so in sensitive patients or unruly children. Genuine pain indicates a disturbance in the course of the recovery. If pain is complained of in the wound, or darting in various directions, orthoform may be beneficially dusted on the bandage.

A large bandage is needed in the early days after the operation, and if the cavity remains open such a one has to be used a long time. If my transplantation method is employed, a very simple covering can be substituted at the end of a week, and after that only plaster.

One obstacle to early closure of the opening is the fact that otology is a dead letter to many physicians. In making the radical operation, I insist that the patients shall remain under my care, or, if they live at a great distance,

[1] This operation is described in *Archiv f. Ohrenhlkde.*, 3 and 34.

under that of some other specialist. Despite this understanding, patients, especially the very poor, go home too early and never return. They have an idea that their physician can bandage the ear as well as anybody else. But most physicians have no idea (though it is not their fault, but that of their education) of the purpose of the radical operation, and cannot understand the difficulties in the way of changing the dressings. Many think it is a specialist's conceit, if the latter hesitates to recommend a patient to them. If the cavity is open, they can at least get some idea of the case, and if the patient reports occasionally, recovery is fairly sure. It is, however, in cases of treatment through the meatus that physicians fail, for ultimately the patients return with profuse granulations, and a second operation, hardly less dangerous than the original, has to be performed.

If we wish to let the wound close we must not resort to pedunculated flaps, but we may try Thiersch's transplantation, to which I will soon return. If we tampon from the meatus only, the wound will close rapidly. Sometimes it tends to do so, though not desirable, and therein lies the failure of the whole operation. *We do not have it completely in our power to choose the exact time at which we can abandon the retro-auricular opening and its advantages.*

The middle ear is not always covered with epidermis when closure occurs, so that we are deceived about the course of the case. Often where the epidermis has begun to form rapidly, it as suddenly stops, and unforeseen difficulties ensue. If at that time the opening is cicatrized, we have the same troubles as after the primary suture, and they are especially great if the entrance of the meatus has not been enlarged.

Having so far chiefly discussed *the certainty of the recovery*, we turn to *the time taken for obtaining it.* It is hard to say by which method cicatrization occurs most quickly. In the first place, the date of actual recovery is not sure, because many patients at the time when cicatrization is nearly completed disappear. Furthermore, the time depends on the plastic method employed. In tuberculous processes, in inaccessible caries, and in disease of the inner ear, it is no matter,

so far as the rapidity of the epidermic process is concerned, whether we close the cavity by the primary suture or not. There are also cases in which the cicatrization is complete in a few weeks, only a minute spot still leaks; we hope it will close in a few days, but, instead, weeks and months are needed.

Assuming that the operated region will cover with skin the more rapidly, the more healthy the skin we insert, several plastic methods have been suggested to shorten the cure. This happens actually so in those cases in which, all that is morbid being removed, the tendency to recovery is rapid, but in those obstinate cases which we should be most glad to relieve, recovery is tardy despite the plastic operation. The flaps heal well, but we wait in vain for proliferation from the edges. Some claim that flaps are dangerous because pus may form beneath them, or that they may cover diseased bone, but I have never met with such instances.

Every operator gradually gets more sure in the performance of the radical operation, more accurate in placing the bandages, and from time to time he alters his plastic method. If he then gets better results, it is hard to say whether this is due to his greater skill or to the method employed. With private patients, too, the results are more favorable than with those in hospital who are badly nourished; in the case of children this is more noticeable still.

We must study statistics of the after-treatment, in order to determine the longer or shorter process of healing in various methods of operating. We must assume, in their absence, that the formation of epidermis progresses more rapidly in cases going on normally with the primary suture, than with the retro-auricular opening without the plastic operation, and slower still than the latter with pedicled flaps from behind the ear or with transplantation of skin. So far as my observations go, this is the actual state of affairs. The same is the case when the cavity is very large, either because the destruction was extensive, or because cells far to the rear had to be opened. Then again when recovery is retarded an energetic secondary operation or insertion of bits of skin will hasten recovery. In such conditions the retro-auricular orifice is an advantage.

I regret to deny Panse's assertion, that the good results from transplantation of epithelium are due to the previous removal of granulations. With a healthy substratum for insertion of Thiersch skin-flaps epidermization takes place with a rapidity impossible without transplantation. I have seen openings which showed no signs of epidermis, covered in a fortnight after transplantation.

In order to discover the average time needed for complete recovery, I have studied all accessible literary sources,[1] and I find that taking all in all we can say that the average duration of time needed for recovery from the radical operation, as performed by some twenty separate operators, is from three to four months.

I have before remarked that the opening behind the auricle is a deformity, the larger the opening the greater the deformity. Gaping orifices of this sort are not only disfiguring, but dangerous, because they may give occasion for relapses. Therefore, so far as safety permits, we should make an opening as small and as little disfiguring as we can. The size will depend more on the anatomical relations of the parts, and the condition of the middle ear, than on the operator. Bezold leaves as much bony tissue as he can on the posterior wall, and only chisels away enough so that the posterior wall shall leave no recesses. This is only in very favorable cases so far as I can judge. Moreover, we should not use pedicled flaps, as they contract the canal and prevent the formation of epidermis at the margins.

Primary closure has its advantages, but the formation of epidermis is more certain and rapid if we leave the opening chiefly to its own recovery. For that reason I shall not, or rather I should say I shall not yet, abandon the retro-auricular opening in the radical operation.

The condition of affairs is different when recovery is complete. With simple caries, or chronic affection of the mucosa, there is no reason to keep the opening persistent. But we ought not to close it until the epidermis is everywhere firm,

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[1] The original paper here devotes three entire pages to various papers, which I compress into a single paragraph. Those desirous of exact information can consult the German original in the Editor's hands.—THE TRANSLATOR.

and not inclined to proliferate or to become eczematous. This essay has nothing to do with cholesteatoma, and from our present knowledge we cannot answer precisely when the opening is to be closed in that disease. Hence I limit myself to reasons for opening or closing the opening in cases not cholesteatomatous.

The hope that relapses would be a thing of the past after introduction of the radical operation have not been fulfilled, but they are rarer, because those causes which brought them about have ceased with increased space and freer access of air. The entrance of air by the widened meatus is indeed enough. If it is objected that sufficient time has not yet elapsed since the introduction of the operation to decide regarding relapses, we can reply that cases have now been free from relapse for some years, and amongst them cases of cholesteatoma in which formerly (after the antrum operation) relapses were confidently expected. If a cholesteatoma relapses and is not soon discovered, it can be just as dangerous with an open orifice as with one that is closed, for which reason long observation of patients is essential. Occasional relapses can be discovered without a retro-auricular fistula, provided that there are no pockets. If the original cholesteatoma were small, and occupied but little space in the attic, there is but little fear of relapses into the mastoid.

I close the fistula from a cholesteatoma if the skin has remained smooth and free from irritation for six months or possibly a year, and especially if I have sensible patients on whom I can rely to return occasionally for proper examination. I let the opening remain persistent if during the course of the observation eczema forms on the cicatrix, or if superficial layers of epidermis exfoliate, or if the case be one of a tumor extending into the antrum, or filling the entire mastoid. At this point I would remark, that I have not often seen abundant formation of crusts after recovery from cholesteatoma has once set in. My reason for getting rid of the matrix in these cases is because Morf says that cases operated by Siebenmann's method show in the early stages symptoms of proliferation.

The radical operation is now done at my clinique in the

following way (compare at this point Plates I. and II.). The primary incision begins below, a little above the tip of the mastoid, about two *cm* behind the insertion of the auricle and extends upward to about one *cm* above the linea temporalis, at which point it comes nearly in contact with the auricle. We thus get a slightly convex incision, as shown in Fig. 1, Plate I. The skin is dissected up to the auricle. Only now is the periosteum incised, parallel with and close to the insertion of the auricle. Then it is stripped off the bone backward and to the tip of the mastoid, and cut away as far as it lies bare. The upper and posterior walls of the meatus are loosened and pulled forward with a long hook. If possible the anterior wall remains *in situ*. In this way the entire field is so widely exposed that we can enter the middle ear by Schwartze's, Stacke's, or Zaufal's methods.

After completing the operation on the bone the external meatus is split open as far as the cartilage of the auricle (*b c*, Fig. 3, Plates I., II.) and by a second incision perpendicular to the first (as far as *d*), thus forming from the meatus a large upper flap, the soft parts of which are removed with scissors. After the flap is tilted upward, its anterior margin (*d c*, Fig. 4, Plates I., II.) is united with the anterior edge of the bony wound by two sutures (from *h* to *i*). The auricle is then hemmed with two sutures, of which Siebenmann complains that it takes time, but by omitting a needle-holder and using straight needles it takes about two minutes. The lower flap of the meatus is sutured to the lower portion of the anterior margin of the bony wound, at the concha (Fig. 4), with a needle-holder and small curved needles. The flap being small and not projecting as in the sketch, which is exaggerated for the purpose of demonstration, considerable skin is dragged into the cavity. Next we form a quadrilateral flap by elongating the original incision in the skin (*e*, Fig. 4) forward and downward to *f*, about one and a half *cm*, and then going up to *g*. The breadth varies according to the need of covering a larger or smaller portion of the bony cavity, the length upon how far we carry the incision upward (as suggested, even to *g g*[1]). In order to avoid

FIG. 1.

a visible scar in the neck, it is important that the incision *c f* should not go beyond the lower margin of the auricle. After preparing this flap, the skin defect is easily closed by sutures (Figs. 5 and 6, Plates I. and II.), the anterior margin (*g f*) being fastened to the posterior margin of the bony wound. In tamponing through the meatus the upper flap is pressed against the bone, and the quadrilateral flap is held in position by a probe (Fig. 1 in the text) and also by the tampon.

To judge from the sketch, one would think that the formation of the flap as suggested was complicated in comparison with that of other otologists, but it can be easily learned, and takes about fifteen minutes to form. I first took a flap from the neck, now I take it from behind the auricle, so that the scar is very small. Before, a view of the parts was difficult, now it is easy. I generally use thirteen needles, with catgut or silk, as the case may be. The retro-auricular opening which results is slit-shaped (Fig. 7, Plates I., II.), can be easily covered with plaster, and is hardly noticeable, but it can be easily enlarged by pulling the auricle forward, and so give a full view of the interior of the cavity. During the after-treatment it contracts about one half (Figs. 7 and 8).

When the cavity is small the quadrilateral flap is made smaller, or larger with a large opening. In this way I can alter the opening as I happen to think best. In the same way large and disfiguring openings can be spared the patient. By imagining the flap in Fig. 6 drawn upward, one can see how the opening can be altered in size. The same plan can be employed in sinus thrombosis or other operations, except when a previous scar prevents the formation of the quadrilateral flap. So, too, the risk of covering in dead bone can be avoided. If the tip of the mastoid is suspicious, it can be removed before rotating the lower flap, whilst on the upper wall of the cavity to which the meatus flap is transplanted, everything suspicious can be got rid of, if necessary, by exposure of the dura.

With reasonable recovery the cicatrization is rapid, because most of the cavity is covered with healthy skin. If the formation of epidermis is slow, I encourage it with skin-

grafting, but only when the secretion is slight, and there is no inclination to granulations. I generally transplant on the fourteenth day, and flat granulations are scraped off after preliminary cocainization. Pain during this manœuvre means that the granulations have been let too long alone, or that diseased bone is present. Grafts can be taken from the arm by Schleich's anæsthetic method and the whole cavity covered in; generally every graft attaches itself.

The radical operation has been done in my clinique the past year 54 times, including 15 for cholesteatoma. The complications included 6 periosteal, 5 perisinuous abscesses, 5 sinus thromboses, and 1 meningitis. No fatal cases occurred from the operation. Two died from thrombosis, and one from meningitis. The latter case was only attempted at the urgent wish of relatives. One case of thrombosis showed at the autopsy a cerebellar abscess, and the other metastatic pulmonary abscess. Two of the patients died six weeks afterwards from pulmonary tuberculosis, and another six months later from laryngeal tuberculosis.

This leaves 49 cases, 2 of which coming at intervals for change of bandage are still uncured; 3 left, of whom we only know with certainty that 1 was uncured, and 1 had to be operated again.

Of the 44 traceable, the after-treatment averaged 15 weeks. We call it cured when the whole channel is cicatrized. There was 1 case of relapse, 3 of occasional eczema. The average treatment of 18 patients treated in various ways, with and without skin-grafts and flaps, lasted twenty weeks.

Twenty-six patients operated as herein described had an average treatment of 11 weeks. If we leave out two patients who took 22 and 28 weeks to recover, my average time of recovery would be better even than 11 weeks. One of these was treated at home after operation, and the other was not skin-grafted until many weeks after the operation. The shortest time was $3\frac{1}{2}$ weeks. The longest 44 weeks, in a boy with weak heart, extensive mastoid caries, and perisinuous abscess. The radical operation was done for this boy in twenty minutes, and in my haste I probably overlooked

some caries. But we could not keep him too long anæsthetized.

Relapses may still occur in this list, but my fears of this accident are small judging from the appearances of the cicatrix. The average time of cure for cholesteatoma was about 13 weeks.

It is difficult to decide when the secondary closure of the retro-auricular opening should be attempted. We must in every case weigh the *pros* and *cons*, and must rather let the fistula exist too long than too brief a time. In cholesteatoma I only decide on this point at a late date. Generally I am influenced by the width of the meatus.

I *perform secondary closure* by first producing Schleich's anæsthesia, and then making at the outer margin of the orifice an oval incision, which must not lie inside the cavity. The skin is then loosened freely away, together with the periosteum, and so made very movable. This results in leaving four margins, as shown in Schema 1, Fig. 2, adjoining;

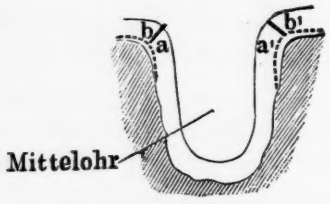

FIG. 2.—Schema 1.

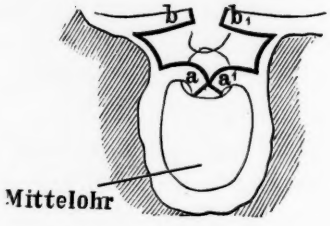

FIG. 3.—Schema 2.

that is to say, two inner margins (a, a^1) and two outer (b, b^1). The two inner ones are turned over towards the inner ear and so sutured that fresh surface lies next to fresh surface. This is accomplished with bent eye-forceps and a modified Bowman needle (compare Fig. 5 in the text). Then with three sutures the two external freshened surfaces are likewise sutured and drawn together as in Fig. 3. In this way we cover the retro-auricular orifice with a bridge which is cuticular in both directions. By this method we can cover in defects both large and small, and save osteo-plastic operations. Additionally we can thus correct any misplacement

of the auricle produced by the original operation. Recovery by first intention follows, and no disfiguring scar results.

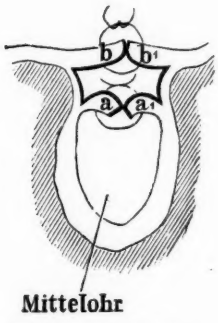

FIG. 4.—Schema 3.

FIG. 5.

To sum up, we can truly say, from experience, that this method has served us well in Heidelberg, can be easily performed, the plastic operation enables us to cover a large portion of the bony cavity with healthy skin, we can make the retro-auricular opening large or small, skin transplantation hastens the recovery, the after-treatment is simple, after-operations can be easily performed, the orifice can be temporarily covered with plaster, is small and not disfiguring, the time for cure is brief, when the epidermis has formed the opening can be rapidly closed without narcosis, and the time at which this has to be done, considering the condition of the cicatrix, depends wholly on the operator's opinion.

BIBLIOGRAPHY OF PAPERS ON THE RADICAL OPERATION FOR MIDDLE-EAR SUPPURATION.

STACKE, *Die operative Freilegung der Mittelohrräume*, 1897.

GRUNERT, *Beitrag zur operativen Freilegung der Mittelohrräume*, 1896.

SIEBENMANN, "Cholesteatoma," *Berl. klin. Wochensch.*, 1893, No. 1.

KOERNER, *Arch. f. Ohrenhlkde.*, Band 37, p. 130.

KRETSCHMANN, *Klin. Vorträge*, Band ii., Heft 1; *Arch. f. Ohrenhlkde.*, Band 37, p. 25.

PANSE, *Arch. f. Ohrenhlkde.*, Band 34.

JANSEN, *Vortrag*, Dresden, 1897.

GRUNERT, *Arch. f. Ohrenhlkde.*, Band 35.
SCHMIEGELOW, *Zeitsch. f. Ohrhk.*, Band 25.
HOLMES, *ibidem*, Band 25.
BARNIK, *Arch. f. Ohrenhlkde.*, Band 42, p. 96.
REINHARD, these ARCHIVES, vol. xxiv., p. 156.
MÜLLER, *Charité Annalen*, Band 21.
MORF, *Mitheil. a. d. Kliniken. d. Schweiz*, iii. Reihe, Heft 7.
ZAUFAL, *Arch. f. Ohrenhlkde.*, Band 37, p. 76.

THREE CASES OF BRAIN ABSCESS FOLLOWING OTITIS MEDIA.

By ARTHUR H. COE, M.D., Spokane, Wash.

THE following cases of brain abscess are reported with the thought that each possesses points of interest and unusual symptoms that may be of value to the profession. I was fortunate in securing an autopsy in each case, so that the records are complete.

Case 1.—**Acute purulent otitis media. Mastoid and intracranial complication. Death from double abscess in the frontal lobe and meningitis.**

W. W., age twenty-eight, a wood-chopper from Heron, Mont., presented himself for treatment, with the following history. Some months previous he had severe pain in the left ear for a week or ten days, followed by a free discharge of pus which continued for some days, then chills and high fever, with vomiting, and great pain over the left side of the head. This condition gradually got better, and there was marked improvement in hearing, though the discharge still continued.

On examination there was found to be quite a free purulent discharge from the middle ear, with granulations arising from the upper wall, and evidences that attic suppuration had continued for some time, and that pus had burrowed above the drum and broken into the canal. No history of any nervous disorder, or of any specific disease.

Under treatment he began to improve as to diminution of discharge and increased hearing distance. About two weeks later, however, his appearance was not so good; he had daily elevation of temperature from one to two degrees, with more or less pain in the ear and side of the head, appetite poor, and tongue coated. The discharge from the ear was still quite free.

He was taken into our private hospital, the canal was irrigated with hot water, and three leeches were applied to the base of the tragus, bleeding being encouraged. Following this he felt much better, pain and fulness in the head decidedly improved. Two days later, however, the temperature rose to 102.5°, with increase of pain in the ear, and the discharge became less free. There was some tenderness over the mastoid, and some slight redness running down the sterno-cleido-mastoid muscle. While the signs of mastoid involvement were not very marked, it was thought that pus must be present, and that his condition warranted an operation.

Under ether, I opened the mastoid antrum by the usual incision and Buck's trephine. The probe passed freely into all the cells, but no pus was found. The cavity was irrigated and packed with iodoform gauze. The next morning there was a free discharge of pus from the mastoid; the condition of the patient, however, was better, the temperature declined to 100°, and the facial expression improved.

The progress of the case for four or five days was uneventful, but on the fifth day the temperature went up to 103.5° and the pain in the head and ear became severe. The discharge from the ear was still quite free. Next day the patient had a chill, the temperature rose to 105°, but there were no signs to indicate where the pus was retained.

Some days later there was noticed a swelling of the neck along the sterno-cleido-mastoid muscle, with some tenderness. During all this time the patient had many severe chills, with a temperature often reaching 105 to 105.5°, accompanied by severe pain in the side of the head.

Our opinion was that pus had broken through the bone just inside of the insertion of the muscle to the mastoid process and had burrowed down the sheath of the muscle, or, possibly, had found an exit with the jugular vein, and was contained within the sheath of that vessel. Under cocaine, I made an incision along the anterior border of the sterno-cleido-mastoid muscle, and carefully separated and turned it back; but outside of a swelling and indurated condition of the body of the muscle, nothing was found.

Patient took nourishment and stimulants well, and continued in about the same condition for some five days, when the swelling in the neck was decidedly more apparent and tender to the

touch, and on several occasions it was thought fluctuation could be detected, so I introduced an aspirating needle through the body of the muscle, and pus was found, being contained between the inner border of the muscle and its sheath, and directly over the jugular vein. The pus cavity was opened by the Hilton-Roser method, *i. e.*, retaining the needle in place as a guide, a grooved director was insinuated along this, and, later, a pair of delicate dressing forceps, which, being widely opened, gave vent to about two ounces of thick greenish-yellow pus. The opening was enlarged, irrigated, and a drainage tube inserted. Improvement was manifest at once by a fall of temperature and pulse, and relief from pain and tension.

The discharge of pus was very free for some days, when it gradually ceased and the cavity filled up. All the time this process was going on the discharge still continued from the external meatus.

A fair condition of the patient continued for a week or ten days, when it was noticed that the right leg was not moved as freely as the left, and this became more apparent from day to day. There then came on intense headache, confined to the left temporal and frontal regions, causing the patient to groan and cry aloud for hours at a time. No medication had any effect on this pain, the depression and vomiting caused by morphine being worse than its slight and transient anodyne effect. The temperature most of the time was normal, pulse 60 to 70 and full ; there was a tendency to constipation ; no delirium, and none at any time during the progress of the case, and no symptoms referable to the eyes.

The *paralysis of the leg was now decided, and gradually involved the right arm and hand. At this time there was also hesitancy in speech and loss of memory for words.* Patient lay in a semi-stupor ; at last paralysis of the facial muscles of the right side supervened. During the last few days of this period there was no complaint of pain, but soreness was present on striking the head over parietal bone.

The symptoms and course of the case for the succeeding ten days presented a classical picture of cerebral abscess, with the exception that, assuming the pus to have originated from the diseased condition in the temporal bone, the motor areas were involved in just a reverse order of the usual. For, if you will remember, the centres for face, arm, and leg are situated on each side of

the Rolando fissure, with the face centre the lowest and nearest to the seat of trouble in this case, while the leg centre, which first showed involvement, is the highest and at the upper curve of the cerebrum. Notwithstanding this contradiction, the majority of symptoms pointed so strongly to pus within the cranial cavity that it was thought best to operate, with the hope of discovering and evacuating the pus. The point selected for the application of the trephine was in the so-called dangerous area of Barker, where eight out of ten abscesses originating from middle-ear suppuration are located. This area is a circle with a radius of one and a quarter inches, situated one and a half inches above and behind the external meatus. Notwithstanding the fact that this point was somewhat posterior to the motor centres involved, their region could be easily reached by a probe, and the fact of the contradictory symptoms in the motor involvement led us to think best not to go directly down on them.

The head having been shaved and rendered aseptic, the patient was anæsthetized with chloroform, but, the heart not acting kindly, ether was substituted, which was entirely satisfactory. I made a horseshoe-shaped incision down the skull, which was perforated with a three-quarter-inch trephine, and a button of bone was removed. The dura, which was slightly congested, being exposed and opened by a crucial incision, a probe was passed between the dura and brain in all directions for some two and a half inches. Later a thorough exploration was made inside the dura, but without result. The opening was carefully washed out with boric-acid solution, and, on account of slight venous oozing, was packed with iodoform gauze, and the incision closed and dressed.

He recovered from the anæsthetic nicely, there being, however, a slight internal strabismus during the rest of the day. The gauze was removed on the following morning, and union of the wound was primary, without an untoward symptom.

The condition of the patient on the succeeding days was not encouraging; there was involuntary evacuation of the bowels, semi-stupor, great difficulty in talking, but no complaint of pain. He remained about the same for ten days or two weeks, there being complete loss of control of sphincters, and the patient was in a pitiable state.

About the eleventh or twelfth day after the operation his face was brighter, he had improved appetite, and his general condition

was somewhat better; and in the succeeding three days his strides toward recovery were wonderful; the paralysis disappeared, the control of the bowels and bladder was regained, his appetite became ravenous, and he was soon up and walking about; since when he has gained in weight and strength, until now he is in his usual state of health, except a slight amount of facial paralysis, which still remains.

Examination shows the ear to be perfectly dry, with hearing power very fair. At no time during the case was there vomiting which could be attributed to the disease; several times it was present, but always followed the exhibition of morphine.

Such is a brief outline of a case which is remarkable, for, notwithstanding the very grave period of septic intoxication and the absolute cessation of the motor functions of the entire right side of the body and the sphincters, the patient was transferred in some three days from a condition of the most pitiable helplessness to one of comparative health.

The most interesting point for discussion is: What caused the pressure in the cranial cavity on the motor centres, and why were they involved in reverse order? The probabilities were against its being an abscess, for so thorough an exploration as was made would have detected pus if present; and, again, the improvement could not have been so marked and rapid unless the abscess was evacuated; and, lastly, the pus could not readily have formed so high up as to involve the leg centre first, and then work downward. My opinion is, that the constant irritation of the diseased process on that side of the head set up a localized meningitis with congestion and transient thickening of the membranes sufficient to cause pressure on the motor centres, and that the subsidence of this relieved pressure, and the centres not being seriously involved, they rapidly recovered their natural condition.

The patient left the hospital and resumed his occupation as wood-chopper, but in about two months returned, and examination showed the following condition: The facial paralysis had nearly disappeared, the ear perfectly dry, and hearing very good, no interference with motility of arm or leg. He complained of intense pain, loss of appetite and

strength. His condition grew rapidly worse, stupor deepening into coma, and finally death with all the symptoms of brain compression. At the **autopsy** on the following day, I confined my examination to the cranial contents.

The dura was normal except over the motor areas on the left side, where it was closely adherent, being detached with difficulty; it was greatly thickened and there was considerable inflammatory deposit of a fibrinous nature on the cortex.

The area of the adhesion and thickening corresponded exactly to the motor areas of face, arm, and leg.

On section of the *left* hemisphere, an abscess was found occupying the *lower and central portion of the frontal lobe.* It consisted of two distinct sacs, the larger the size of a hen's egg, having walls of considerable thickness. The smaller sac gave evidence of more recent formation, by its thinner and less organized walls. The cerebral tissues were softened even for some distance from the sac and broke down readily.

On account of the depth of the abscess from the surface, it was not strange that I failed to locate the pus, at the time of the operation.

It is my opinion that the conjecture made in the first place as to the paralysis being caused by the local thickening of the meningitis was correct and that the abscess had nothing to do with the paralysis, for on his return there were no symptoms of paralysis, and the abscess was not only there, but probably larger and in a more active state. I do not mean to imply that there was no connection between the meningitis and the abscess, but that the pressure causing the involvement of the motor centres was occasioned by the meningitis.

CASE 2.—**Acute relapse of old purulent otitis. Death from abscess in temporal lobe.**

J. C., æt. forty-six, painter, had been suffering for some three weeks with an *acute otitis* when I first saw him. There was intense pain, at times so severe as to produce symptoms of mania, when he would get up and escape from the house and wander about the yard in his night-clothes. There was a fairly free discharge of muco-pus from the left auditory canal. There is a history of previous attacks of otitis, and scars showing a double

mastoid operation had been done,—patient says when a child. Temperature ranged from 99° to 100°, pulse from 80 to 90 of good quality. No specific history obtainable. He was removed to the hospital and for some days his condition remained unchanged. The only symptoms at this time were the intense pain and slight hesitancy in speech, but as the patient has been very deaf for years, this was attributed largely to the deficient hearing. There was considerable tenderness over the left side of the head, not decided over the mastoid, however; nevertheless I thought it advisable to open the mastoid, which I did, finding almost complete obliteration of the antrum and mastoid cells. I thoroughly cleaned out the middle ear and tympanum, but only a small amount of ichorous pus was evacuated. There was no improvement in his condition. There was more marked dulness and the patient took little or no nourishment. The eye grounds were examined repeatedly with negative results. Absolutely no symptoms of compression, and normal motility over the whole body. The temperature was normal, pulse 60 to 70. While I felt certain that there was intracranial involvement, the absence of any compression symptoms, and with nothing but the intense pain and slight mental dulness to guide me, I made a diagnosis of subdural abscess. The location presumed to be over the roof of the left tympanum.

The case was watched for a few days, but there being no change the patient was anæsthetized, and the scalp having been shaved and rendered aseptic, I made a horseshoe-shaped incision down to the bone, the centre point of which was about an inch above and slightly backward from the meatus. A button of bone about an inch in diameter was removed, disclosing a normal dura. A probe was passed in all directions as far as possible between the skull and dura, with negative results. I then incised the dura and repeated the exploration with a like result. The condition of the patient at this time was bad, pulse was very poor and face cyanotic. He was given a hypodermatic injection of $\frac{1}{20}$ of a grain of sulphate of strychnia, and the anæsthetic suspended. I intended to explore the cerebrum proper with trocar, even though the symptoms did not warrant the belief that an abscess existed within the brain tissue. I made one or two punctures forward and downward, but the condition of the patient was so poor that my confrères advised against continuing the operation. The wound was rapidly closed and dressed, and patient removed to bed, sur-

rounded with hot-water bottles, and stimulated. His return to consciousness was much delayed, and thereafter, until the time of his death four days later, there was extreme stupor deepening into absolute coma.

The following day I did an **autopsy,** limiting my examination to the cranial contents. The meninges and cortex were found normal. On making sections of the left cerebral hemisphere a small abscess cavity was discovered in the temporo-sphenoidal lobe, about one inch below the surface, directly under the point where I had made the trephine opening. The pus cavity was traced downward to the upper surface of the petrous portion of the temporal bone, and a minute sinus was found extending into the tympanic roof through the superior plate of the bone, thus determining a point of direct infection. There was some pus bathing the upper surface of the petrous portion of the bone. The total amount of pus was not over one ounce. It was very unfortunate that the exploration in this case was not continued farther, as, in all probability, the pus would have been discovered, and the patient given a chance for recovery.

CASE 3.—**Acute purulent otitis media and mastoiditis. Death from cerebellar abscess propagated through the inner ear.**

Mrs. H., aged twenty-eight, housewife, presented herself for treatment with the following history: Some weeks ago she had severe pain in the right ear, which finally culminated in a discharge of pus and some relief from the pain. The ear had discharged freely for some weeks, but finally the pain began again, and the discharge became less free. She had considerable headache and some dizziness; a physician whom she consulted gave her drops to put in the ear for the pain, and a powder to be blown into the canal. This only added to the trouble, as it hardened and retarded the outflow of pus. The pain became more decided, and there gradually developed a facial paralysis on the right side. Her condition at the time of my first examination was as follows: Canal of right ear swollen and tender, the bottom completely filled with several polypi, leaving only a minute opening for exit of the discharge; the temperature was $100\frac{2}{5}^{\circ}$, pulse 108; mastoid region somewhat tender. Decided right-face paralysis, probably from erosion of the nerve within the canal. With curette and

forceps the polypi and granulations were thoroughly cleaned out from the bottom of canal, showing a drum partially destroyed and bare bone in all directions. Instructions were given for irrigation of the canal with hot water, and a mixture of potass. bromide and chloral hydrate was ordered for its sedative effect.

Her condition was somewhat better for a few days, but it was evident, from the continuance of temperature and pain, that the mischief was done, and the trouble was deeper than the middle ear. She was removed to the hospital, and I did a thorough mastoid operation, liberating pus freely and much granular tissue from the antrum. I also removed a portion of the wall between antrum and canal. Her condition did not improve as it should have done after the operation, which, together with the increasing stupor and the intense head pain, referred to the vertex, made it clear to me that there was infection within the cranium. The symptoms were so vague that to locate the abscess was an impossibility, as she had no compression symptoms, only occasional vomiting and dizziness; the temperature was now normal, and pulse from 60 to 80, only fair in quality. The fundus of both eyes was carefully examined, but there was no optic neuritis found. The pupils were both moderately dilated, and responded rather tardily to light. She took nutriment very poorly, and her condition was rapidly failing. Without definite points to guide me, I located the abscess above the petrous portion of the temporal bone, because that was the point of infection, and the majority of abscesses from otitis media are found in that region, so I decided to make the trephine opening just above and behind the external canal. The operation was set for 8.30 on the following morning, but when we reached the hospital she had failed so much during the night, that the physicians who saw her in consultation advised against operating, as her chances of surviving the shock of operation were few. The stupor increased, she gradually sank, and died early the next morning.

An exceedingly remarkable state of affairs was found. At the **autopsy,** on removal of the calvarium, the meninges and cerebrum were found congested, but otherwise normal. When the tentorium was divided along the *upper border of the petrous portion of the right temple bone, pus exuded from the internal auditory canal.* The outer surface of the petrous portion of the bone had a normal appearance, but when the

outer casing was removed, the entire inner structure of the bone was honeycombed. The inner wall of the middle ear was destroyed, as were also the semicircular canals; there was a large opening between the middle ear and the mastoid antrum. The cell walls of the mastoid were destroyed, forming one large cavity. Following the pus backward there was found an *abscess* cavity which was moderately well defined in the *right cerebellum* near the median line, with pus diffused in the surrounding tissues; we estimated that the cavity contained about two ounces of pus.

Unfortunately, the position of the abscess was such that it produced no symptom to direct us to its location, and even had I known absolutely where it was, an operation to evacuate it would have been exceedingly hazardous, and in all probability unsuccessful.

It is a trite saying that we often learn more from an unsuccessful case than from those that have a more fortunate termination, and the hope that some points have been brought out which may be of value to others, has led me to report these my unsuccessful cases of brain abscess.

A CASE OF CHRONIC SUPPURATIVE OTITIS MEDIA, FOLLOWED BY CEREBRAL ABSCESS AND SUPPURATIVE MENINGITIS—OPERATION—DEATH—AUTOPSY.

By EDWARD B. DENCH, M.D.

The patient, a Cuban, about thirty-six years of age, came under my observation at the New York Eye and Ear Infirmary, with a history of having suffered from intense pain in the left side of the head for about two and a half weeks. During a part of this time, according to the statement of his friends, he was delirious. For a number of years the patient had been subject to repeated attacks of severe headache, confined to the left side of the head; the present attack, however, had been more distressing than any of the preceding.

Upon otoscopic examination both drum-membranes were found to be destroyed, and there was a small amount of fetid pus in either tympanum. Pressure over the left mastoid elicited no tenderness, and palpation of the neck gave no evidence of jugular or lymphatic involvement. There was slight tenderness upon percussion over the left temporo-sphenoidal region. The patient was greatly emaciated, and presented all the signs of severe constitutional infection. The temperature upon admission to the hospital was 102°.

Under the ordinary aseptic precautions, I **operated** upon the left mastoid, having made the necessary preparations to enter the cranial cavity, in case this seemed desirable. The mastoid was sclerotic throughout. The antrum was situated at a depth of about seven eighths of an inch below the surface, and was exceedingly small. After reaching the antrum considerable *cholesteatomatous* material was removed both from this cavity and from the tympanic vault by means of the curette. The antrum and tym-

panic vault were then made continuous with the external auditory meatus by the well-known Stacke-Schwartze procedure. The posterior wall of the membranous external auditory canal was split longitudinally, thus making two flaps which could be pushed into the bony cavity. Owing to the short time which the case had been under observation, and to the possible necessity of future operative procedure, the wound in the soft parts was not sutured. The external auditory canal and the cavity in the bone were packed with iodoform gauze, and the ordinary antiseptic dressing applied. The headache was somewhat relieved by this operation, but the temperature steadily rose until, on the following afternoon, it reached 103.8°. The temperature then fell spontaneously, but again rose in the course of a few hours to its former height. A little over twenty-four hours after the first operation the patient developed distinct symptoms of *amnesic aphasia*. As an intracranial lesion had been suspected from the first, I did not hesitate, after the development of this symptom, to enter the cranial cavity. The original incision was extended forward to the external angular process of the frontal bone, and the cranial cavity entered about an inch above the external auditory canal. The meninges were found intensely congested and somewhat thickened. A meningeal flap was reflected, and the brain substance was explored by means of a large aspirating needle. At first nothing but broken-down brain tissue was obtained upon aspiration. At the next insertion of the needle, however, a little turbid fluid was withdrawn. A knife was then plunged into the temporo-sphenoidal lobe and a free incision made. A large amount of broken-down brain tissue was immediately discharged from this opening. The index-finger was introduced into the opening, and entered a large abscess cavity in the temporo-sphenoidal lobe. Little or no pus was present, the contents of the cavity consisting almost entirely of broken-down brain tissue. By the cautious use of the finger this softened tissue was removed as completely as possible, until the firm limiting walls of the abscess cavity could be made out. A strip of sterilized gauze was next passed into the opening in the temporo-sphenoidal lobe for the purpose of drainage. The surrounding region was protected by iodoform gauze, the soft parts replaced, and the usual antiseptic dressing applied over the entire wound. Immediately upon recovering from the anæsthesia, the aphasia disappeared. The temperature also fell about a degree and a half. A few hours later, however, the patient had a

chill, and the temperature began to rise slowly. Owing to a necessary absence from town, I at that time placed the case in the hands of one of my colleagues. Twenty-four hours after the second operation the dressing was removed, for the reason that the temperature still remained high; upon the application of a fresh dressing the condition of the patient seemed to be improved, the temperature falling to 102°. This improvement was only temporary, however; the temperature steadily rose, and finally reached 106°. Death followed on the fourth day after the opening of the temporo-sphenoidal abscess.

The **autopsy** revealed a purulent leptomeningitis, involving the entire left side of the cerebrum. The abscess cavity in the temporo-sphenoidal lobe corresponded exactly to the condition made out at the time of the operation. No other abscesses were found in any portion of the brain. The left lateral sinus contained a moderately firm clot which did not extend below the sigmoid portion. This clot was evidently several days old, and, without doubt, explained the sudden and excessive elevations of temperature from which the patient suffered. There was also a recent clot in the torcular, and in the lateral sinus of the opposite side. The roof of the tympanum was carefully examined, but no perforation was found. From the condition of the bone in this region, however, and from the thickening of the overlying dura, it seemed probable that infection had taken place through the communicating veins. It is impossible to say how long the abscess had existed in the temporo-sphenoidal lobe. Not infrequently these purulent foci remain latent for a long time, and only become active as the result of some exciting cause. It is probable that the meningitis remained localized for a considerable period, and became diffuse only a short time before the patient came under observation. Had the patient applied for relief when the symptoms first appeared, there seems to be no question as to the fact that recovery might have followed operative interference.

A CASE OF PERISINUOUS EPIDURAL ABSCESS, WITH FACIAL PARALYSIS.—OPERATION.—RECOVERY.

By FRED. WHITING, M.D.,

AURAL SURGEON TO THE NEW YORK EYE AND EAR INFIRMARY.

THE rapidity with which, under circumstances favorable to the attack, purulent processes of the middle ear invade and infect adjacent structures, has been the occasion of frequent remark and a fertile source of discussion, the bacteriological features of which afford a theme of engrossing interest.

The observation was long ago recorded that certain micro-organisms, uniformly present in greater or less abundance in suppurative ear diseases, develop, when operating in the presence of other pathogenic germs, greatly increased activity and intensified virulence, as, for example, during the systemic disturbance incident upon measles, scarlet fever, or grippe. Under such circumstances extensive destructive changes take place in the bony walls and investing membranes of the cavities of the temporal bone, and extend thence with dismaying rapidity to the meninges and other intracranial structures. Whether the resistance of the tissues thus involved is greatly reduced by nutritive changes in the blood, attendant upon general infection, or whether the complementary action of the systemic germ so exaggerates the destructive force of the local infection that ordinary resistance does not avail, is most interesting speculation, and neither theory is lacking in supporters.

Upon one point, however, the experience of all honest

observers is in accord, namely, that while a large proportion of the cases of suppurative ear diseases, if recognized early, are amenable to successful clinical treatment, there is a certain proportion of cases which, no matter how early they are seen, or what measures—antiseptic, prophylactic, or antiphlogistic—may be instituted for their arrest, progress unfavorably, and the course of the disease is in no wise retarded nor its virulence in any degree abated. These cases do badly from the beginning, and the patient is simply beguiled by the futile efforts of his medical adviser.

It is impossible to doubt but that in two varieties of cases essentially similar in many of their manifestations, but dissimilar in termination, the one progressing uniformly favorably, the other with equal uniformity unfavorably, the nature and quality of the infecting germs must radically differ, and the self-complacency of that enviable practitioner whose cases always do well and never experience serious complications is liable to rude and sudden shock in encountering just such a malady, and the patient will be lucky indeed if, while serving to disillusion the fatuous physician, good fortune so far attend upon him that his life is spared, in spite of misdirected professional ministrations.

My own practice has afforded several embarrassing demonstrations of the futility, under certain circumstances, of all recognized forms of treatment, and so strong has become my conviction in this regard that it can be formulated in the following proposition: the course and termination of otitic affections are, in certain instances, dependent upon the virulence of the *initial infection alone*, and are absolutely *uninfluenced by any clinical measures* for its relief.

The history of a case which forcibly illustrates the unfavorable course pursued by an otitis, in which, in spite of early recognition and intelligent and unremitting care, the disease progressed, resulting in a grave and well-nigh fatal complication, is here appended:

A few weeks since, I was requested by Dr. Noyes to see with him in consultation a patient, a girl of fifteen years, who had been under observation for nine days. The illness began with a severe

coryza, upon which acute catarrhal otitis media supervened, accompanied by moderate pain and slight pyrexia.

When called to the case, Dr. Noyes found, upon physical examination, a membrana tympani, red in color and bulging forward and downward in the superior posterior quadrant ; there was no sagging of the membranous canal ; the mastoid aspect presented a normal appearance, and very firm pressure in this region was required to elicit signs of tenderness. Myringotomy was immediately performed, which resulted in the evacuation of a small quantity of sero-sanguinous fluid, in which the presence of pus could not be with certainty determined.

Hot douching every two hours was employed, without, however, marked alleviation of the symptoms, the pain in the ear, with scanty discharge, persisting during the following five days.

Upon the sixth day patient had almost entire relief from pain, and the discharge was no longer noticeable. She said that for the first time since the earache began, she felt quite comfortable. Upon the afternoon of this same day, when awakened from "a nap," she became conscious that her right eyelids did not close properly, and that she could not whistle ; at the same time the distortion of the features was noticed by members of her family.

Conditions remained unchanged during the seventh and eighth days ; there was but slight discomfort from the ear and practical cessation of discharge. The facial paresis was a little more pronounced. The temperature, which had been recorded three times daily, averaged 99.5° F., the highest point registered being 100.5° F.

When called to see her, the following appearances presented themselves upon physical examination :

The membrana tympani and membrana flaccida were bulging downward and forward sufficiently far to conceal the short process of the malleus. There was also a slight sagging of the superoposterior segment of the membranous canal. A minute perforation in the inferior posterior quadrant of the membrana tympani could be recognized as the site of the paracentesis performed several days previously, and from this opening there protruded a small thread of sticky, firmly adhering plastic lymph acting as a most effective obstacle to drainage. The mastoid aspect was negative upon inspection, but firm pressure over the site of antrum, and tip as well, elicited an immediate response from the patient which effectually dispelled all doubts regarding mastoid tenderness.

Immediate operation was advised, and was performed upon the afternoon of the same day at the New York Eye and Ear Infirmary.

A curvilinear incision was made one quarter of an inch behind the post-auricular fold, extending from one half inch below the mastoid tip upward about one half inch above the temporal ridge. Flaps retracted, periosteum normal in appearance and easily elevated as far downward as the lower third of the process, where the tendinous attachment of the sterno-mastoid and other muscles required to be divided with the scissors, that the exposure of the tip might be satisfactory.

A round and narrow apophysis was exposed with small, almost rudimentary supra-meatal spine and foramen; cortex appeared quite normal and exhibited several small cribriform areas for the transmission of nutrient periosteal vessels. The cortex was first removed in a narrow groove, with a gouge, close to the posterior canal wall from the supra-meatal spine to the tip. As soon as the cells were encountered they were found to contain firm granulation bodies, and a probe introduced under the overlying cortex could be passed in several directions for varying distances, not with the unimpeded sweep with which a sound traverses a spacious cavity, but following along separate radiating channels. Upon removing the remaining cortex these sinuses were found running through the cellular structure of the process and apparently coalescing just below and externally to the antrum. They were filled with firm granulations, the osteitis presenting all the characteristics of osteo-porosis, the granulations being osteoclasts under whose action the basement substance of the bone was rapidly absorbing. Upon all sides of these inflammatory tracts were irregular, small indentations, also filled with granular cells, the so-called Howship's lacunæ.

As soon as the antrum was opened there escaped a gush of gas and a few drops of pus, and upon exploring the roof of the tympanum with a probe, a small opening was encountered which communicated with the middle fossa and from which simultaneously with the introduction of the probe some bubbles of gas escaped, but no recognizable pus. The posterior bony canal wall was now cut away, the aditus opened, and the ossicles (malleus and incus) removed, also the tubercle of the zygoma and the tegmen tympani and antri. This procedure resulted in exposing a mass of plastic lymph investing all that portion of the temporo sphenoidal lobe

resting upon the superior surface of the petrous bone and extending downward and backward into the cerebellar fossa along the course of the descending portion of the sinus sigmoideus and apparently as far backward on the posterior surface of the petrous pyramid as the internal auditory meatus. The lymph at the periphery of the opening in the skull was firmly adherent, and tightly sealed off the abscess cavity from the surrounding meninges, but the central portion was soft and bulging, and that a view of the sinus might be had for its critical inspection, was subjected to careful traction, when it readily came off in long sticky strips, discovering the sinus wall to be reddened and lacking its usual shiny lustre, but not apparently thickened, and inasmuch as it readily dimpled beneath the finger, and pulsated as well, aspiration was not resorted to, but the sigmoid groove was more extensively cut away in order that should symptoms subsequently arise indicating a septic phlebitis, the necessary operative procedures for the relief of such a condition would be greatly facilitated.

The entire mastoid process was removed, and in the large pneumatic space at the tip and in several of the smaller adjacent spaces a dark semi-turbid fluid was found almost of the color and consistency of coffee dregs ; this was free from odor. In cutting away the bony canal wall and aditus, the tympanic course of the facial canal was carefully scrutinized and found to be free of all caries. The bone was not even roughened anywhere in the vicinity, so that I assume the wall to have been inviolate.

After thorough cleansing and packing of the deeper portions of the wound with iodoform gauze, the flaps were stitched at the upper angle, and the remainder of the wound dressed open.

During the days immediately following the operation, the patient was cheerful and exhibited no symptoms indicative of sinus or other intracranial involvement. She had for some time an afternoon elevation of temperature averaging 100.4° F., for which the healthy appearance of the wound and the comfortable condition of the patient failed to account. However, upon orders being given that all visitors should be excluded, the temperature speedily subsided and all elevations were thereafter insignificant.

The rapidity with which the facial palsy disappeared subsequent to operation was most gratifying. Twenty-four hours after operation there was noticeable a distinct improvement in the actions of the affected muscles, and with each succeeding day the disability diminished, until on the tenth there was, so far as the

patient knew or close observation could discover, complete restitution of function.

So brief had been the duration of the inflammatory stage in this case that the vitality of the patient had not suffered great impairment, and the subsidence of her surgical fever marked the beginning of a speedy and uninterrupted convalescence.

Physical examination at the present date shows slight narrowing and drooping of the membranous canal at middle third, complete reconstruction of the membrana tympani, which was looking rather thin and atrophic. Mastoid aspect exhibits a few cutaneous granulations at the site of the original incision, in the healing of which no deformity or displacement of auricle has resulted.

The features of especial interest in this case are: *first*, the remarkable rapidity with which the purulent process invaded the skull and attacked the meninges. Whether this was due to the presence of a dehiscence or fissure in the roof of the tympanum, having only a membranous wall which speedily succumbed to the inroads of ulceration and opened an avenue for the entrance of pathogenic germs—or whether the suppuration spread along the course of a small vein perforating the tympanic roof and thus gaining access to the adjacent dura, whence it extended itself along the petrous bone backward into the posterior fossa, and inward sufficiently far toward the apex of the petrous pyramid until pressure was made upon the trunk of the facial, at or before its entrance into the foramen—or whether, again, the initial virulence of the germs contained in the pus confined in the attic expended itself in eroding the tegmen tympani, will remain a matter for interesting but unproductive speculation. In any event there was a perforation in the tympanic roof and the progress of the inflammation from that point was by direct contiguity.

Second, the extraordinarily early appearance of facial paralysis in the course of an acute otitis, in a patient otherwise in perfect health and who had never before suffered from ear disease. Had such a complication manifested itself early in the progress of an acute exacerbation of chronic suppurative otitis, it would not have occasioned special remark, or, in the absence of other symptoms, excited grave appre-

hension; but under the foregoing circumstances it was regarded as indicating at least a strong probability of intracranial involvement, which the subsequent findings of operation amply verified.

The rapid restoration of function of the facial was quite to be expected after the removal of the lymph and granulations which made pressure upon the nerve trunk at its entrance to the petrous bone. In this connection it is of interest to note that the audition of the patient, which was markedly embarrassed before operation, still shows very great impairment, as might be anticipated in view of the extensive traumatism to which the conducting apparatus was subjected. That the disability lies mainly in the middle ear is easily recognized by a glance at the appended functional examination made upon patient ten days ago:

FUNCTIONAL EXAMINATION—RIGHT EAR.

Watch = 0.

Acoumeter = 1 ft. Bc. > Ac.

Forced whisper = 4 ft.

Weber { Vertex / Brow / Incisor teeth } { Strongly lateralized to the right (operated ear). }

Upper tone-limit = Galton (Dench) $1.\frac{5}{}$.

Lower tone-limit = C^1 (256 V. S.).

	R.	C.	$C.^1$	$C.^2$	$C.^3$	$C.^4$
Rinné:		Bc	Bc	Ac	=	Ac
Schwabach: A.C.	0	5″	12″	8″	5″	
Schwabach: B.C.	21″	8″	25″	8″	7″	

Had the test shown reduction of the upper tone-limit, without elevation of the lower tone-limit and increased bone conduction, associated with tinnitus and vertigo, the inference would be quite justifiable that the nerve as well as the conducting apparatus was implicated.

Third, the importance to be attributed to facial paralysis as a symptom of gravity and an urgent indication for immediate operation.

Could it be with certainty determined from any group of symptoms that the paralysis was due to pressure upon the nerve trunk from plastic exudation surrounding the internal

auditory meatus, there would be no hesitation in recognizing the manifestation as an imperative demand for opening the skull, but, unfortunately for differential diagnosis, practically the same line of clinical symptoms will appear whether the lesion occurs in the course of the nerve through the canal of Fallopius, or before its entrance into the temporal bone. Should it be possible simultaneously with complete facial paralysis to demonstrate a similar involvement of the auditory nerve, very forcible contributory evidence would be adduced in support of the diagnosis of pressure at the base, but such a convincing array of symptoms is seldom present. The physiology of the facial nerve in its course after the chorda tympani is given off is thoroughly well understood, and the manifestations of loss of function, even where the impairment is slight, are so pronounced and distressing as to preclude the possibility of the lesion passing unrecognized either by patient or medical attendant; but with the recognition of the distorted visage and the staring eye, the doctor rests content for diagnostic purposes and does not interrogate the patient for symptoms of other muscular disabilities, which a searching inquiry would disclose, but which, to the victim of the infirmity, are, by comparison with his glaring deformity, quite too insignificant to attract attention. With a person of adult age and moderate intelligence it ought to be possible, by painstaking examination, to elicit responses indicating the presence of symptoms which are commonly entirely disregarded, and which depend for their expression upon disordered function in those communicating filaments of the seventh which are given off at the geniculate ganglion to other cranial nerves, whose motor source they thus constitute.

The only muscles, other than those of facial expression and those supplied by the chorda tympani, whose action would be paralyzed by pressure upon the facial nerve in or about the internal auditory meatus, and whose function could be interrogated with some reasonable hope of detecting their disability, are the tensor palati, levator palati, and azygos uvulæ.

The tensor palati derives its motor supply from a fila-

ment of the facial, originating at the geniculate ganglion, communicating with the small superficial petrosal nerve, and thence through the otic ganglion contributed to the muscle.

The levator palati and azygos uvulæ derive their motor supply also from filaments originating in the geniculate ganglion and communicated to the large superficial petrosal nerve, thence through the Vidian contributed to the muscles.

The combined action of this group of muscles in its association with the act of deglutition is not of paramount importance, and the embarrassment attendant upon loss of function would perhaps escape the attention of a not over fastidious patient, but like many another symptom, inquiry concerning the presence of which receives prompt confirmation, the infirmity in the absence of such interrogation by the physician passes unheeded or, at any rate, unmentioned; that a critical inspection of these muscles may, under favorable circumstances, contribute an illumining ray to facilitate the steps of a doubtful diagnosis does not seem an unwarrantable anticipation.

As regards the appearance of facial paralysis in the course of acute suppurative otitis, when mastoiditis is present there can be no diversity of opinion relative to its significance. As a symptom, it constitutes an imperative demand for immediate operation.

In the case just cited, notwithstanding the promptitude displayed in operating, the sigmoid sinus was already invested with lymph over a considerable area and a periphlebitis established, in relieving which condition any delay, even if of but a few hours' duration, would have been most hazardous.

REPORT OF THE MEETING OF THE NEW YORK OTOLOGICAL SOCIETY OF MAY 24, 1898.

By Dr. H. A. ALDERTON, Secretary.

President, Dr. Gorham Bacon, *in the Chair*.

On motion of Dr. McKernon, seconded by Dr. Fridenberg, Dr. Charles H. Burnett, of Philadelphia, was invited to take part in the proceedings of the Society.

Dr. McKernon: **Report of a Case of Bezold's Mastoiditis, with Double Perforation.**

A. W., aged twenty-three, native of the United States, applied at my service at the Infirmary for treatment on April 17, 1898, giving the following history:

Had always been in good health, no diseases of childhood, no ear trouble until four weeks ago, when he had a severe pain in left ear, continuing for three days, when the ear broke and a profuse purulent discharge began. He consulted a physician, who enlarged the opening in the drum membrane, and the discharge had continued steadily since, though less in quantity than at first. The week before he came to the clinic pain commenced again in the left ear, and the discharge increased in quantity. Ten days later he felt pain behind the ear and over the left temporal region.

Upon physical examination, a profuse purulent discharge was seen coming from the external auditory meatus of the left side. The posterior and superior canal walls were collapsed, and a large opening was present in the posterior-inferior quadrant of the drum membrane. The tissues over the mastoid were swollen and boggy, this swelling extending downward in the neck for about three inches below the tip of the mastoid. There was also a swelling in the neck, posterior to the mastoid, extending back-

ward to the occiput. There was marked induration along the border of the sterno-cleido-mastoid muscle, which was exceedingly tender on pressure. His temperature was 100.6° An operation was advised but refused. He, however, consented to remain in the hospital, and an ice-coil was applied, not with any idea of abating the disease, but to make him more comfortable. The next day all the symptoms increased, and he consented to have an operation.

Ether was given, and the usual mastoid incision made, the tissues being very thick over the mastoid. Upon retracting the soft tissues and exposing the bone, the cortex was seen to be white, and looked rather healthy. An opening was made in the antrum, and pus and granulation tissue removed. The whole mastoid area was involved and removed, and communication established with the middle ear through the aditus. A probe was passed downward through the tip into the digastric fossa, and pus welled up in the opening made by the probe. The tip was removed, exposing the digastric fossa and an abscess cavity found burrowing downward into the neck, along the sheath of the jugular and carotid vessels. This abscess cavity was evacuated and curetted. An opening was also found about ¾ of an inch above the tip, and posteriorily, leading into an accumulation of pus, corresponding to the external swelling and œdema in the occipital region. This was removed and the cavity curetted. The sinus was exposed over its centre for more than an inch, and was accidentally opened with the curette and a very free hemorrhage took place, which was controlled by packing gauze against it. Each abscess cavity, as well as the mastoid area, was packed with a separate piece of gauze, the posterior cavity being about four inches in depth.

An uninterrupted recovery followed, the temperature at no time rising above 99.4,° and he was discharged from the ward service eight days from the time he was operated upon.

Points.—Thick mastoid cortex, white color of cortex, and double Bezold perforation.

Discussion.—Dr. KNAPP had a similar case of abscess under the sterno-cleido-mastoid muscle, and extending also under the deep fascia of the neck. After second operation, fever again, and found another deep-seated abscess along and behind the posterior border of the sterno-mastoid muscle down to near the clavicle. The large opening above was supplemented by a

counter-opening at the lower end of the abscess. The cavity was drained and syringed out daily. There was a rapid recovery, which has proved permanent, without any disfigurement or loss of hearing power.

Dr. WILSON spoke of the extreme thickness of the outer table of the mastoid, as a factor in determining the direction of infection. Extreme thickness of the outer table is of course unusual, but happened to be present in Dr. McKernon's case.

Dr. WHITING asked as to the condition of the sinus.

Dr. MCKERNON, in answer to Dr. Whiting's question, the sinus was uncovered below to bend, the dura over sinus was darker than normal in color and was prominent, the sinus was partially covered with granulation tissue which was removed.

Dr. GRUENING thought that a free opening should be made in dissecting cervical abscesses and the cavity packed, rather than make small incisions and depend upon tubes for drainage, as the sinus serves as a field for infection.

Dr. KIPP thought curetting and packing the sinuses sufficed in many cases.

Dr. MCKERNON is in favor of freely opening up the abscesses. Still he has had good results from counter-opening.

Dr. BURNETT, taking advantage of the invitation extended to him to take part in the proceedings of the Society, stated, in regard to perforation of the medial plate of the mastoid process into the digastric fossa, that he had seen a case recently in consultation. Male, aged sixty-two years, had had otitis media for six months and was pyæmic. A counter-opening had been made behind the sterno-cleido-mastoid muscle and a spontaneous opening also existed in the canal. When seen by Burnett a post-pharyngeal abscess was detected in process of formation. The mastoid was opened and found free from disease; abscess from mastoid tip extending towards the pharynx and nucha. These pus cavities were opened up thoroughly, curetted, and packed. Recovered in a month. Hearing much better.

Dr. ALDERTON presented a case of **Cholesteatoma of the Attic and Antrum** in which healing had been brought about, after ineffectual treatment by ossiculectomy, by the use of syringing through his modification of Hartmann's canula. This modification consists in a prolongation of the upright tip in the segment of a circle, about one third of an inch in length, so that when introduced into the attic the opening of the canula points toward

the aditus and lies in its tympanic mouth. The cleansing solution is thus thrown through the aditus into the antrum, washing out this cavity thoroughly. Medicated solutions may also be introduced in the same manner, after cleansing and drying out the antrum.

Dr. Kipp referred briefly to a case in which he had **Accidentally Opened a Semicircular Canal** in an effort to reach the mastoid antrum from the external ear canal. He had performed an operation on the same man ten years previously for intense pain in the mastoid. He found a sclerosed mastoid and did not reach the antrum. Patient recovered. Recently patient returned with great pain in the same region ; found cholesteatoma in the tympanic cavity. Operation : suddenly while chiselling the posterior wall a stream of clear watery fluid issued from the region of the semicircular canal. The operation was discontinued. The clear watery fluid continued to flow for four days uninterruptedly. Facial paralysis was noticed when patient came out of the ether. Pulse fell to fifty a minute after the operation and for some days the temperature was about 104°. The patient suffered greatly from vertigo whenever he raised his head. He gradually improved and four weeks later, the operation was completed by removing lateral wall of antrum and aditus, together with the hammer and anvil. The antrum was found to be rudimentary in size and contained only granulations. The facial paralysis is still present, but otherwise patient is well. The ear was totally deaf before the operation.

Dr. Burnett spoke on the **Etiology of Acute Mastoiditis.**

He has never seen a case of acute mastoiditis following acute otitis media in which he has had charge of the treatment from the outset. He thinks it is not a necessary result, but an artificial one. In every case of acute otitis media we have a certain amount of inflammation of the aditus and antrum. He thinks we should not be too anxious to secure a cessation of the discharge.

Between neglect and over-treatment he would take neglect, in acute otitis media.

Discussion.—Dr. Kipp said that in his opinion the treatment of the otitis media could not be held responsible for the development of the mastoiditis in all cases. He had seen several cases of acute purulent inflammation of the middle ear in which the most careful and appropriate treatment, by competent otologists, from the very beginning of the disease did not prevent the develop-

ment of mastoid abscess. In his own practice he had seen mastoiditis develop in many cases in which inflation of the middle ear was purposely omitted, and in cases in which it was practised. He had seen the mastoiditis developed mostly in cases which had received no treatment whatever. Only recently he had operated on a child two years of age, in whom a suppurative inflammation of the middle ear developed during an attack of measles. The ear received no treatment. Three weeks after the appearance of the measles, Dr Kipp saw the child for the first time. He found profuse otorrhœa, large perforation in posterior half of drum membrane, a large fluctuating swelling behind the auricle. Operation same day. The cortex was perforated. The mastoid contained a large pus cavity into which the sigmoid sinus protruded. The child recovered. Dr. Kipp has no doubt that in many cases the mastoiditis commences soon after the development of the inflammation in the tympanic cavity.

Dr. GRUENING reported a case, treated by himself from the beginning, of otitis media with complicating mastoiditis and sinus thrombosis, which resulted in death. He thinks that there are often such cases in which mastoid complications are unavoidable. We distinguish between tip and antrum tenderness. In streptococcus otitis, in spite of the best treatment, we may see the mastoid involved from the beginning.

Dr. FRIDENBERG said that mastoid disease is rare when the aural suppuration is due to simple coryza, more frequent after the exanthemata, and comparatively common after grippe; in other words the virulence of the original affection determines the probability of mastoid implication. In some cases the inflammation seems to attack the mastoid from the start, to the entire or partial exclusion of the middle ear. Hence the best treatment of the middle-ear trouble may not secure immunity to the mastoid. Pus in the mastoid does not always call for an external operation. A fair proportion of cases recover under ordinary treatment.

Dr. BURNETT, in conclusion, believes that there is a natural siphonic action which empties the suppurating antrum.

He related a **Case of Tetanus** in a boy of fifteen without any apparent causation. Had o.m.p.c. Mother had been for a year or two in the habit of syringing the ear with an old rusty syringe, which was probably the cause of the tetanus.

Dr. DENCH: History of a case of **Brain Abscess**; presentation of specimen.

Male, thirty-six years old. Double o.m.p.c. for many years. The patient gave the history of severe left-sided headache, of several weeks' duration. During the past week there had been some delirium. Upon examination, there was no tenderness over the left mastoid, but some tenderness on percussion over the left temporo-sphenoidal lobe. Temperature on admission 102°. Immediate operation by the Stacke-Schwartze method. Mastoid found sclerotic, tympanic vault filled with cholesteatomatous material. Twenty-four hours later, temperature 103⅘°, severe headache, and also the appearance of amnesic aphasia after first operation. Exploratory craniotomy performed at once; the cranial cavity entered just above the external auditory canal; dura exceedingly hyperæmic; dural flap reflected, brain substance explored by aspirating needle, and fluid withdrawn from temporo-sphenoidal lobe. Free incision in temporo-sphenoidal lobe, opening into large abscess cavity, which was thoroughly cleared out by means of the finger. Abscess cavity packed with sterilized gauze, ordinary antiseptic dressings applied to wound. Death four days later.

Autopsy.—Abscess in temporo-sphenoidal lobe, purulent leptomeningitis of left hemisphere, firm thrombus in left lateral sinus, and soft thrombi in torcular and right lateral sinus. The limiting walls of the abscess cavity in the temporo-sphenoidal lobe firm on all sides. (See full report, p. 247 of this number of the ARCHIVES OF OTOLOGY.

Discussion.—Dr. GRUENING has at present time under his care a case of brain abscess in a boy of seventeen years. Operation, cholesteatoma of tympanum and antrum. From a perisinuous abscess about four ounces of fœtid pus escaped. Much improved for nine days, then became again unconscious. Wound dressed and offensive pus evacuated from around sigmoid sinus. Opening made over ear in squama. Exploratory aspiration into temporo-sphenoidal lobe entered into pus cavity. Pus had escaped by spontaneous perforation below. Gauze dressing; on second dressing, ventricular fluid escaped (cerebro-spinal fluid). Is improving. Bacteriology: the proteus vulgaris was found; it seems to be a pathogenic germ and not only a bacterium of putrescence. The characteristic odor is due to it.

Dr. KNAPP thinks there may be large cerebral abscesses with-

out any surrounding zone of softening, that could be operated on with good prospects of preservation of life without conspicuous damage to the functions of the brain. Dr. Dench's case seems to be one of those in which the symptoms of sensory aphasia would be very helpful in localizing the abscess. Cases are on record, for instance one by Manasse in the March (1897) number of the ARCHIVES OF OTOLOGY, in which in an affection of the left ear the patient could see and recognize objects but not name them, though he could easily repeat the word when it was spoken to him. Such cases are now called optical aphasia, and referred to a lesion of the memory centre of visual impressions. The patient, unable to call the object by name if he sees it, can call it when he touches or hears it—that is, when he recognizes it with the help of another sense. Manasse's patient, when a bell was shown him, could not name it; but when it was rung, he instantly said "a bell." An abscess in the temporal lobe was diagnosticated, and by an operation found and permanently cured; also the optical aphasia disappeared. Freund, who first described such cases, refers them to a lesion in the connecting paths between the occipital and temporal lobes. They are cortical in mere optical aphasia, but subcortical, involving the optical radiation, if they show homonymous hemianopsia, as in a case of mine, which also was cured by an operation, but the hemianopsia has persisted. A very instructive paper has recently appeared in the *Lancet*, February 22, 1898 by James Hinshelwood entitled "A Case of 'Word' without 'Letter' Blindness," the cause of which was assumed to be a lesion in the visual word-memory centre situated in the angular and supramarginal gyri on the left side of the brain, and supplied by a branch of the Sylvian artery, supposed to be blocked up. Hinshelwood cites other cases and discusses the subject in a very clear and suggestive way.

Present:—Drs. Charles H. Burnett, of Philadelphia; A. E. Adams, of Newburgh; Gorham Bacon; E. B. Dench; J. E. Sheppard; N. J. Hepburn; W. B. Marple; F. M. Wilson, of Bridgeport; J. F. McKernon; F. Whiting; C. H. May; J. B. Clemens; M. Toeplitz; E. Gruening; J. B. Emerson: H. Knapp; J. L. Adams; C. J. Kipp, of Newark; E. Fridenberg; F. J. Quinlan; T. P. Berens; and H. A. Alderton.

REPORT ON THE PROGRESS IN OTOLOGY FOR THE FOURTH QUARTER OF THE YEAR 1897.

By Dr. A. HARTMANN.

Translated by Dr. Arnold H. Knapp.

ANATOMY OF THE EAR.

280. Czinner, H., and Hammerschlag. Contribution on the embryology of Corti's membrane. Sitzungsbericht der kais. Akademie der Wissenschaften zu Wien. *Math.-naturw. Classe*, vol. cvi., part iii.; also in *Arch. f. Ohrenheilk.*, vol. xliv., No. 1.

281. Held. On the peripheral distribution of the auditory nerve. *Arch. f. Anatomie*, etc., 1897, Nos. 5 and 6.

280. In the cochlea of the 3.6-*cm*-long embryo of the guinea-pig, the membrane of Corti appears as a spiral band, which is broad in the basal convolution and gradually grows smaller toward the apex. It arises from the free edge of the crista spiralis, and originates in the ectodermal cells lining the ductus cochlearis. Two regions may be recognized, the inner next to the epithelium, and the outer, free, separating into fibres, which are the further development of fibres composing the inner region. Later the membrane becomes attached to the reticular membrane by four rows of fibrous bundles. The bundles are the cilia which grow from the auditory cells and lift up Corti's membrane. The membrane is made up of fibres which are stained black with osmic acid.

A large survey of the literature is given, though no mention is made of Baginsky's article on the subject which appeared in the *Arch. f. mikroscop. Anatomie.* Krause.

281. In horizontal sections through the cochlea of the pig-embryo, Held found that the peripheral processes of the ganglion cells of the spiral ganglion show many diverging branches, which

cross many fibres coming from other parts of the ganglion, and partly with these surround the same area of hair-cells. At the same time these processes send off nerve-fibres which in the region of the spiral ganglion pursue a circular course, and are considered by Held to be collaterals of the peripheral processes of the cochlear cells. Thus a greater or smaller number of hair-cells situated at a distant portion of a cochlear turn are connected with a ganglion cell of the spiral ganglion. One and the same nerve-fibre can be irritated by varyingly high tones, which is contrary to the nervous distribution based on Helmholtz's theory of tone perception. The author assumes that a distribution of branching nerve-fibres takes place in the organ of hearing on the principle of various combinations to explain that small differences in tones can be perceived and composite sounds analyzed.

HAENEL.

GENERAL.

a—REPORTS AND GENERAL COMMUNICATIONS.

282. New York Ophthalmic and Aural Institute. *Twenty-eighth Annual Report*, 1897. Drs. Knapp, Toeplitz, and Coburn.

283. New Amsterdam Eye and Ear Hospital. *Ninth Annual Report*, 1897. Drs. Pooley and Myles.

284. GUYE. The acoustic signals of railways and the auditory acuity of laborers.

285. LAUFFS, F., Heilbronn. Clinical reports. *Württ. med. Corr.-Bl.*, No. 44, 1897.

282. Number of new ear patients, 1412; opening of mastoid, 19; ossiculectomy, 3; paracentesis of mem. tympani, 31; removal of polypi and granulations, 53; removal of adenoid vegetations, 147; 1373 new nose and throat patients. GORHAM BACON.

283. Number of new patients, 330: removal of fibrous tumor, 1; paracentesis membrana tympani, 3; polypi removed, 3; mastoid operation, 2. GORHAM BACON.

284. GUYE has tested the four more usual signals on ten moderately deaf laborers, and concludes that the continuous tone series is the best method for testing, but as it usually is inaccessible, testing with whispering voice is sufficient. Hearing of whispering voice in 1 *m* should be required for railway employees, and it should be carefully inquired into that no otorrhœa or interference with nasal respiration is present.

G. ZIMMERMANN.

285. LAUFFS reports a number of unusual cases. Four cases of rhinoliths; one case of adhesion between the septum and the lower and middle turbinates on one side caused by inexperienced galvano-cauterization; one case of spasm in the lip and cheek branches of the r. facial nerve cured by treatment of the nose: one case of two symmetrical congenital perforations in both ant. palatal pillars; removal of a piece of egg-shell imbedded in the larynx; and finally a case of aural polyp of the size of a pigeon's egg which protruded from the auricle. E. MÜLLER.

b.—GENERAL PATHOLOGY AND SYMPTOMATOLOGY.

286. PONFICK, E., Breslau. On the general pathology of middle-ear disease in early childhood. *Berliner klin. Wochenschr.*, Nos. 38–41, 1897.

287. ETIÉVANT. On monauricular diplacousis. *Ann. des malad. de l'otol.*, etc., No. 11, 1897.

288. GRADENIGO. On a form of physiological diplacousis in Rinne's test. *Ibid.*, No. 12, 1897.

286. Among 100 post-mortem examinations, at the Breslau Children's Clinic, of children, the majority under one year and the remainder not over four years, only 9 cases were found where the middle ear was normal; in 13 the otitis was single, in 78 the otitis was double. The cause of death was cardiac lesion, dermatitis diphtheria, pneumonia, gastro-enteritis, tuberculosis, etc. Indefinite local symptoms were present in 10 cases, together with more or less well-marked general symptoms. The autopsies showed, aside from moderate splenic tumors, that the middle ear alone was the seat of marked changes and exudative inflammation. These cases show that otitis media may occur as an independent infectious disease, and may cause death. PONFICK observed the clinical course of this form of otitis without fatal issue on his own children. In the first year, or the first half of the second year, an apparently primary enteritis sets in, without known cause, until a fresh otitis appears, which seems to be the primary lesion, as after the establishment of the discharge the intestinal symptoms cease abruptly. In these cases the staphylococcus albus and aureus are frequently found. In one of the cases the bacterium was even found in the blood. The exudate was usually purulent, rarely mucous, sero-fibrinous, or hemorrhagic; it frequently contained cholesterin. In only five per cent. of diseased middle ears, did perforation take place. When toxic

products are absorbed, general infection occurs with swelling of the spleen, degeneration in liver and kidneys, and especially intestinal symptoms. MÜLLER.

287. ETIÉVANT has published two additional cases of that rare affection, one-sided diplacousis. The two patients were women, and were completely deaf on one side. The one heard for two months the various voices in the deeper scale when a single person conversed with her; the other was especially annoyed in hearing singing, instead of one tone she would hear three or four in varying pitch, and when a number of persons sang she heard an inharmonious mixture. In both cases prolonged treatment with catheterization was beneficial. Etiévant is inclined to consider the affection to be due to disturbances in the transmission of tones rather than a lesion of certain nerve-fibres in the labyrinth. A single air insufflation sufficed in many cases to cure the complaint. ZIMMERMANN.

288. GRADENIGO has observed with his clamped tuning-forks in the lower octaves that they permit the perception of the fundamental tone by air-conduction, but that the first over-tone is alone heard when they are placed on the bone; this is not the case in the higher octaves. He also observed that when the fork C with 64 vibrations was placed on the mastoid process and the next higher c-fork was held before that ear or the one on the opposite side, the c with 128 vibrations only is heard, and that as soon as the tuning-fork heard by air-conduction was removed did the fork on the mastoid emit its fundamental tone of 64 vibrations. The latter phenomenon, according to Gradenigo, may be regarded as an example of exhaustion, but the former must be physiological, which enters into account in many pathological cases, especially in the forms of diplacousis.

ZIMMERMANN.

c.—METHODS OF EXAMINATION AND TREATMENT.

289. LUZATTI. On bone-perception of the watch in the diagnosis of aural affections. *Ann. des mal. de l'or., du lar.*, No. 10, 1897.

290. PANSE. An objective tone-measure. *Arch. f. Ohrenheilk.*, vol. xliii., p. 251.

291. DENNERT, H. On the examination of hearing with tuning-forks. *Arch. f. Ohrenheilk.*, vol. xliii., p. 276.

292. BIEHL, C. The recognition of one-sided and double-sided deafness. *Arch. f. Ohrenheilk.*, vol. xliii., p. 256.

293. LAVRAND. On air-insufflation through the Eustachian tube, a modification of Politzer's method. *Rev. hebdom. de lar., d'otol.*, No. 49, 1897.

294. BREITUNG, M., Coburg. Pneumatic massage of the drum-membrane with the aid of an electro-motor air-pump in the treatment of progressive deafness. *Deutsche Medicinal-Zeitung*, No. 77, 1897.

289. LUZATTI passes in review the usual methods for testing the hearing, and recommends his own method, which consists of the comparison of the bone-conduction of a watch placed on the tragus and then on the mastoid process. Normally the watch is heard better on the tragus; if the reverse is present, an affection of the sound-conducting apparatus is probable; if the perception at the tragus is diminished and absent over the mastoid, a disturbance in the sound-perceiving apparatus is indicated. The author thinks that this method is especially of value in low degrees of deafness. ZIMMERMANN.

290. This is a series of experiments with tuning-forks to determine an objective tone-measure from the amplitude of vibration, which should be read in the original article.

BLOCH.

291. DENNERT pursues the following course to test the relative hearing power of tones of varying pitch with the aid of tuning-forks. Two resounding forks of a different pitch are allowed to exhaust themselves intermittently before a normal ear until they are no longer perceived in this manner. If at that moment they are placed before the ear, both will again be heard (period of rest) and at equal distances. This holds true in cases where the hearing is uniformly decreased for these various forks. If the hearing is not uniformly decreased, a healthy ear will likewise hear the various forks at various distances. The difference of distance is a measure for the relative hearing. Dennert tests bone-conduction in a similar manner. His method is practically a combination of the Rinne and the Schwabach test.

BLOCH.

292. To discover simulated one-sided deafness, BIEHL introduces a piece of rubber tubing (previously advocated by Voltolini) in the sound ear. If the patient does not repeat when the tube is patent, simulation exists. In bilateral hardness of hearing

or total deafness the possibility of a traumatic neurosis should be thought of. BLOCH.

293. The patient is to blow out his cheeks, while no air escapes by mouth or nose. LAVRAND thinks that thereby many inconveniences in the swallowing of water and phonation are avoided. ZIMMERMANN.

294. BREITUNG has devised this apparatus to shorten the intervals between the movements of the pendulum. The air-pump is connected with an electro-motor, and the amplitude and rapidity of the movements can be easily regulated. H.

d.—DEAF-MUTISM.

295. HEIDSICK, J., Instructor of Deaf-Mutes, Breslau. Deaf-mutes with hearing power. A contribution to the methods of instruction. Breslau, 1897.

295. In the first part of the monograph HEIDSICK criticises the hearing exercises for deaf-mutes. The results obtained are not due to the improvement of the hearing but to the influence on the remnants of hearing by the systematic drill in articulation and speech. The author wants to exclude the excessively deaf children, the improperly-called deaf-mutes, from the totally deaf children during the instruction. The former should be instructed with the aid of suitable hearing instruments by teachers with strong voices.

In the second part Heidsick opposes the tendency to instruct deaf-mutes only with articulate speech and to forbid gesticulation. He agrees entirely with the opinion recently expressed at a deaf-mute convention (Hannover) in favor of the combined system of instruction, the combination of articulate and gesticulate speech. The teacher should employ the gesture speech during the instruction, and the deaf-mutes should be permitted to use gestures among themselves. H.

EXTERNAL EAR.

296. GRUBER, Prof. JOSEPH. Cystomata of the ear. *New York Polyclinic*, Nov. 15, 1897.

297. BURNETT, CHAS. H. Foreign body in the ear. *Philadelphia Polyclinic*, Dec. 11, 1897.

298. HACKLEMAN, F. G. Foreign bodies in the external auditory canal, with report of a case. *Laryngoscope*, Dec., 1897.

299. MILLER, G. VICTOR. A foreign body (tooth) in the ear requiring reflection of the auricle, etc., for its removal. *British Med. Jour.*, Sept. 25, 1897.

300. LEUTERT, E. Periauricular abscess in furuncles of the auditory canal. *Arch. f. Ohrenheilk.*, vol. xliii., p. 267.

301. BIEHL, C. Idiopathic perichondritis of the auricle and the spontaneous othæmatoma. *Arch. f. Ohrenheilk.*, vol. xliii., p. 245.

302. SCHWIDOP. A case of burns of the auditory canal and the drum-membrane. *Arch. f. Ohrenheilk.*, vol. xliii., p. 241.

303. BAR. On otomycosis. *Ann. des mal. de l'or., du lar.*, No. 12, 1897.

296. According to GRUBER, cystomata are generally benign in character and emanate as a rule from the parotid gland or the mastoid portion of the temporal bone. The cystic growths are usually atheromata, and in most instances develop primarily on the pinna or in the ext. auditory canal. Cysts with serous contents are very rare; they are found on the auricle, seldom in the auditory canal and cartilaginous Eustachian tube. Gruber gives the history of a single case of cyst of the ext. audit. canal which he has observed and a cyst in the neighborhood of the Eustachian tube which encroached upon the latter, thereby causing deafness and buzzing in the ear. The first patient was cured by operation; the second died of tuberculosis, and no operation was performed. GORHAM BACON.

297. BURNETT reports a case of foreign body (cherry-stone) resting against the drum-membrane in a child's ear. It was removed by syringing. He draws attention to the dangers of unskilful attempts at removing foreign bodies, especially the use of instruments, and says, "Use the syringe, or let the foreign substance in the ear alone." GORHAM BACON.

298. The case reported was that of a boy, aged twelve, who had suffered from deafness since he was three years of age. Three beans were removed from each ear. The hearing was almost restored to normal. GORHAM BACON.

299. A boy of ten years complained of feeling something hard in his ear. Syringing and ordinary means failed to extract it. On detaching the auricle and chiselling slightly the post. meatal wall, an upper incisor tooth with a broken fang having a sharp edge was removed. On examination later, a slit-like perforation was seen at the upper and back part of the membrane. The

boy denied having put the tooth in the ear, but stated that three weeks previously he had pulled out a tooth in the night.

ARTHUR CHEATLE.

300. The previous history pointed to a furuncle. The mastoid region was swollen, temperature of 40°, and disease of the sinus was thought of. All symptoms, however disappeared in a few days. In another case an abscess appears in the region of the right tonsil. From the condition of the ear a mastoid empyema was suspected, and the operation was made. The diagnosis may often be difficult to make. The position of the abscess, the tenderness of the ear canal, the persistent fever, and evacuation of necrotic masses spoke for a furuncle. BLOCH.

301. Two cases in soldiers, occurring without trauma. In the perichondritis with serous exudate, suppuration began after incision. Both healed without disfigurement. BLOCH.

303. BAR gives a full description of our present knowledge of otomycosis, and two personal observations. Attempts at inoculating two doves with aspergillus were unsuccessful. The author accepts the general opinion that a particular inflammatory condition in the ear-canal must precede, to permit a soil for the moulds. The treatment should consist in the removal of the mould-scales, irrigation with a solution of chloride of lime, and subsequent instillation of salicylic acid alcohol. In obstinate cases the canal should be swabbed with silver nitrate, ten per cent. solution.

ZIMMERMANN.

MIDDLE EAR.

a.—ACUTE OTITIS.

304. GRUBER, Prof. J., Vienna. Paracentesis of the drum-membrane. *Wien. klin. Rundschau*, No. 4, 1897.

305. MÜLLER, R. A case of acute tubercular otitis media during treatment with "new-tuberculin" (T. R.). *Deutsche med. Wochenschr.*, No. 34, 1897.

306. LATRILLE. Acute suppurative otitis media during broncho-pneumonia. *Rev. hebdom.*, No. 48, 1897.

307. STEIN, V. S., Copenhagen. A case of Bezold's mastoiditis cured during an attack of erysipelas with functional examination. *Monatschr. f. Ohrenheilk.*, No. 11, 1897.

308. PERROT. On Bezold's mastoiditis. Bordeaux, 1897.

304. For two years GRUBER has operated for collection of

exudate in the middle ear in the following manner. The incision begins at the upper and posterior quadrant of the drum-membrane and is carried around the posterior convexity 1 to 1¼ *mm* from the margin, and terminates in front of the lower and posterior quadrant. The membrana is thus incised for some distance, the wound edges gape, and the exudate escapes easily.

POLLAK.

305. A patient with pulmonary consumption was undergoing treatment with new-tuberculin at the Charité Hospital. An offensive left-sided otorrhœa had existed for a number of years. After treatment for several weeks with the new-tuberculin the condition of the affected ear had not changed, and the right ear suddenly began to discharge. Tubercle bacilli could be found in the pus from both ears. Several small spots appeared on the drum-membrane which were regarded as miliary nodules, only one of which, however, broke down and caused a perforation. It seems likely that the treatment with the new-tuberculin caused the sound ear to become affected, or that the infection took place through the Eustachian canal in coughing.

NOLTENIUS.

306. A child, four years old, who had been ill with broncho-pneumonia for three months, developed an otitis a week ago. The discharge contained tubercle bacilli. According to the author, the infection took place through the Eustachian tube by the sputum. ZIMMERMANN.

307. The diagnosis of the mastoid complication during the acute otitis was made from the tenderness over the tip of the mastoid and a swelling beneath the origin of the sterno-mastoid muscle. After the erysipelas, these symptoms and the otorrhœa ceased. G. KILLIAN.

308. This article reproduces most of the hitherto published cases and a new case from Lichtwitz's practice. The operation lasted three hours; the tip of the mastoid was removed and the digastric fossa was tamponed. Healing after two months.

ZIMMERMANN.

b.—CHRONIC PURULENT OTITIS.

309. BURNETT, C. H. Intra-tympanic surgery, especially in chronic purulent otitis media. *International Medical Magazine*, Dec., 1897.

310. FENTON, HICKS C. Excision of membrana tympani and extraction of the malleus and incus for the cure of chronic puru-

lent inflammation of the middle ear. *Medical Sentinel*, Sept., 1897.

311. BRONNER, ADOLPH. A case of cholesteatoma of the attic of twenty years' duration simulating disease of the mastoid process. *Lancet*, Oct. 23, 1897.

312. LUCAE. The conservative and operative treatment of chronic purulent otitis. *Therapeutische Monatshefte*, No. 8, 1897.

313. WINCKLER, E., Bremen. The after-treatment of the middle-ear spaces after their exposure. *München. med. Wochenschr.*, No. 48, 1897.

314. KUHN, Strassburg. Cholesteatoma of the ear. Drasche's *Bibliothek der medic. Wissenschaften.* Teschen, 1897.

315. PANSE, R., Dresden. Cholesteatoma of the ear. *Klinische Vorträge aus dem Gebiete der Otologie und Pharyngo. Rhinologie*, vol. ii., No. 4. Jena, 1897.

309. In this paper BURNETT gives brief notes of thirty operations for the relief of chronic purulency of the middle ear. These cases remained under observation long enough for the writer to draw the following conclusions as a result of removal of necrotic ossicles:

1. Prompt lessening of the discharge in all cases.

2. Ultimate cessation of the discharge and cicatrization of the fundus in nearly one half of the cases, as observed so far.

3. Arrest of the advance of caries and necrosis in the drum cavity, aditus, antrum, and mastoid cells, thus lessening the liability of the occurrence of intracranial lesions of otitic origin.

4. Improvement in hearing in more than half the cases.

5. Marked amelioration in the general health, especially in those cases presenting symptoms of slight septicæmia from the chronic purulency. GORHAM BACON.

310. FENTON reports a case in which he removed the drumhead, malleus, and incus, which was followed by a cure of the discharge, relief from vertigo and tinnitus, and improvement in the hearing and general health. GORHAM BACON.

311. BRONNER'S patient, a man, aged thirty-one years, having had discharge from the right ear for twenty years, developed an abscess behind the auricle. On opening the abscess and exposing the bone no fistula was present, but on opening the antrum the attic was found distended to the size of a cherry by a cholesteatomatous mass. CHEATLE.

312. LUCAE believes that operative exposure of the middle-ear

spaces is at present too frequently performed from a prophylactic or purely therapeutic point of view, and thinks that the time has come when a halt must be called on this operative tendency. The author fails to prove his grave accusation. In the article, which is addressed to general practitioners, he proceeds to enumerate the symptoms which call for operative interference, and states the success which he claims to have had by the conservative treatment. The large number of operations which have been performed on chronic cases in Lucae's clinic does not accord with his plea against the operative fervor. KÖRNER.

313. WINCKLER employs almost all of the known methods of after-treatment either alone or in combination. SCHEIBE.

314. KUHN gives a short and complete description of the cholesteatoma of the ear, with illustrations of microscopical and macroscopical specimens.

315. PANSE gives a similar general description of the cholesteatoma.

c.—COMPLICATIONS OF PURULENT OTITIS.

316. GREEN, J. ORNE. Three cases of extradural abscesses; operations and recoveries. *Boston Med. and Surg. Jour.*, Nov. 25, 1897.

317. MILBURY, FRANK S. A case of otitic brain abscess [epidural] (from chronic otorrhœa); optic neuritis; opening of the mastoid and skull; recovery. *Laryngoscope*, Dec., 1897.

318. CULBERTSON, L. R. Report of a case of bilateral and another of monolateral mastoid disease; recovery of both. *Cincinnati Lancet-Clinic*, Oct. 23, 1897.

319. BARCK, C. Two cases of opening of the lateral sinus for infective thrombus, with a table of operations performed previous to 1897. *Annals of Otol. and Rhinol.*, Nov., 1897.

320. OPPENHEIM, Prof. H. The insuccesses in cerebral surgery due to errors in diagnosis. *Berl. klin. Wochenschrift.*, Nos. 49 and 50, 1897.

321. GRUNERT, C. Extradural otogenous abscesses and suppurations. *Arch. f. Ohrenheilk.*, vol. xliii., p. 81.

322. GRUNERT. Anatomical and clinical contributions to the study of intracranial complications to otitis. *Münch. med. Wochenschr.*, Nos. 49 and 50, 1897.

323. On the value of lumbar puncture for the diagnosis of intracranial complications to ear disease. Supplement to LEUTERT'S article. (See review in these ARCHIVES, vol. xxvi., p. 434.)

324. MOURE. Three cases of intracranial complication in ear disease. *Rev. hebdom. de lar., d'ot.*, No. 43, 1897.

325. STEINBRÜGGE, Prof. A case of otitic brain-abscess. *Deutsche medic. Wochenschr.*, No. 41, 1897.

326. KALMUS, E., Prag. An otitic brain-abscess in the right temporal lobe. *Prag. med. Wochenschr.*, Nos. 51 and 52, 1897.

327. WOLFF, F. On otitic brain-abscess. *Inaug. Dissert.*, Strassburg, 1897.

328. LERMOYEZ. A symptom of thrombosis of the sup. longit. sinus. *Ann. des mal. de l'or., du lar.*, No. 12, 1897.

316. GREEN reports three cases of extradural abscess, the first one being a case of fracture of the skull, with infection and extradural abscess. The patient, a strong and healthy man, twenty-seven years of age, in jumping from an electric car, received a scalp wound over the left parietal bone, and was unconscious for a short time. There was bleeding from the left meatus, followed by a serous discharge. There were two fractures of the temporal bone. Pus was evacuated from the middle cranial fossa.

The second case was that of a man, forty years of age, who had an acute otitis media. A paracentesis was performed a number of times. Finally it became necessary to open the antrum, when the tympanic roof was found carious with a collection of pus in the middle cranial fossa.

In the third case, there was caries of the antrum roof and an extradural abscess.

All three cases were operated upon, and all recovered.

GORHAM BACON.

317. The author reports a case of chronic otorrhœa (left) of many years' standing as a result of scarlet fever. The mastoid cells were involved. Operation performed and mastoid antrum opened. Cells filled with pus and lateral sinus exposed. An opening was formed into the middle cranial fossa, and considerable pus was evacuated. The patient, before the operation, suffered from severe headache, slight paralysis of left side of face and right arm and leg; also amnesic aphasia and optic neuritis (left eye). The patient recovered. Hearing very much impaired.

GORHAM BACON.

318. The first case reported by CULBERTSON was that of a young lady, aged seventeen, in whom it was necessary to open the mastoid cells as a result of acute suppurative otitis media

(right side). The cells were found filled with pus. About three weeks later, the left mastoid process was affected. The patient recovered. Hearing normal on the right side; complete deafness on the left.

The second case was a boy, seven years of age, who had mastoid disease resulting from acute sup. otitis media. Several operations were performed on the mastoid cells, as necrosed tissue was found. Recovery followed. GORHAM BACON.

319. BARCK gives a table of cases of sinus thrombosis reported previous to 1897, of which there were one hundred and twenty-four, with eighty-three recoveries. He gives the histories of two cases of his own, as follows:

CASE 1. Patient, twenty-six years old, had left-sided otorrhœa of many years' standing. Ext. auditory canal filled with foul-smelling pus and granulations. Some tenderness over mastoid. A Stacke operation was first performed. The patient later had chills and high temperature. The sinus was opened and a thrombus evacuated. The flow of blood was established in the upper end but not in the lower one. Later, the int. jugular was ligated, but no thrombi were found. Patient died of septicæmia. At the autopsy, the cause of the blood poisoning was found to be a large abscess under the deep fascia of the neck, below the splenius capitis and levator scapulæ in the post-cervical triangle. Direct communication could be traced between the abscess, the lateral sinus, and the mastoid cavity.

CASE 2. Patient, male, twenty-six years of age, fell from a wagon and became unconscious for three days. He had hemorrhage from the right ear, and complained of dizziness. Later he had a chill, followed by a temperature of 106° F. There was a fœtid discharge from the ear. Under ether, a fracture line in the squamous portion of the temporal bone was visible after detachment of the periosteum. An abscess was found in the line of fracture below the outer lamella of bone. The antrum was free. Lateral sinus was found filled with a thrombus, which was softened and covered with pus. The patient recovered.

GORHAM BACON.

320. OPPENHEIM discusses the diagnosis between brain-tumor and serous meningitis which cannot be entirely cleared up by lumbar puncture. He fears lest the latter procedure become a dangerous experiment in the hands of those lacking in knowledge and experience. The confounding of brain-tumor and brain-

abscess is possible in the combination of tumor and a purulent otitis. In a similar case Oppenheim, notwithstanding the presence of aphasia characteristic for an otitic abscess of the left temporal lobe, was able to make diagnosis of brain-tumor from the condition of the pulse, the temperature, and the absence of any changes in the middle-ear spaces at operation; the diagnosis was subsequently verified at autopsy. The author recognizes the importance of lumbar puncture in the diagnosis of uncomplicated brain-abscess. Leutert goes so far as to conclude that a purulent cerebro-spinal meningitis does not exist in case the bacteriological examination of the puncture-fluid proves negative.

MÜLLER.

321. This is a monograph on extradural abscess based on twenty clear cases. Twelve of these followed acute inflammations; in the chronic forms cholesteatoma usually was present. The abscess is frequently situated in the posterior fossa. In acute cases the dura may be red, or covered with granulations, with fibrinous deposits, or with an abscess-membrane; it may even be unchanged. In chronic cases the dura may be in a sloughing condition. The symptoms are not characteristic; fever, pain, vertigo, may be absent, likewise changes in the eyes and the pulse. The local conditions in the ear are not striking, nor copious otorrhœa. We must always suspect an extradural abscess when an acute purulent otitis, in spite of appropriate remedy, persists for a long time, and gastric symptoms are present. The diagnosis is only assured at the operation if channels are found leading to the dura—fistulous tracts. These tracts are often not found. The treatment is only operative.

Extra-dural suppurations differ from the extra-dural abscess where the dura itself forms a part of the wall of the otitic pus cavity. The bone leading from the diseased middle ear is carious. Granulations spring up on the dura, and it becomes changed as in abscess. The posterior cranial fossa is the most frequent site. BLOCH.

322. A. *Three cases of so-called deep otitic extradural abscess.* CASE 1 has been published in *Arch. f. Ohrenheilk.*, vol. xliii. CASE 2. Acute otitis media. The abscess was likewise situated on the anterior surface of the pyramid near the apex, and death ensued from meningitis. Near the abscess in the tip of the petrous bone there was an ostitic focus. Carotid canal and labyrinth were free from infection. CASE 3. Chronic purulent

otitis. Vertigo, facial paresis, later paralysis, deafness, and polypi. The radical operation disclosed necrosis of the labyrinthine wall and an extrasinuous pus collection. Double optic neuritis. On the twenty-fifth day after the operation the temperature was 39.3°. Exuberant granulations in the middle ear and aditus. Two weeks later two sinuses in the labyrinth appeared and discharged freely. A second operation was undertaken, the labyrinth was opened and the sequestra removed. The probe at this point opened out an extradural abscess on the anterior petrous surface. Recovery. In this case, the unusual quantity of the discharge from the labyrinthine fistula had suggested the probabilities of an abscess. The author in conclusion speaks of the diagnosis of these deep-seated extra-abscesses and the uncertainty in the absence of fistulous tract.

B. *Three cases of healed otitic sinus-phlebitis. Operation on the sinus. Ligature of the int. jugular.*

In the first two cases the diagnosis of sinus-phlebitis was made according to Leutert. (See review in these ARCHIVES, vol. xxvi., p. 124.) In these cases where, according to Leutert, sinus-phlebitis is probable, and the sinus appears externally healthy, it is advised to incise the sinus after ligature of the jugular vein and to tampon especially down to the bulb and upwards to the junction with the sup. petrosal sinus. The circulation through this area is thus obliterated. Both cases recovered, though high fever persisted for some time after the operation. Of course it cannot be stated positively that this method of treatment was the cause of the recovery. In a third and fourth fatal case, the diagnosis was confirmed at the operation. The method employed was the same, except that in the fourth case the unusually long common facial vein was ligated in place of the jugular. SCHEIBE.

323. In two cases meningitis could be excluded; in a third it was diagnosticated. In the fourth case death ensued, possibly from the puncture or the narcosis. The autopsy showed, aside from anæmia and œdema of the brain, no intracranial lesion. A more extensive employment of lumbar puncture is hampered by the uncertainty whether the procedure is without danger or not. SCHEIBE.

324. CASE 1. A boy, four years old, relapsing otitis with severe meningeal symptoms and swelling over the mastoid. The periosteal abscess was incised and carious bone found. The

operation nevertheless was not continued until one week later when the general condition was aggravated. The entire mastoid was filled with pus and granulations to the sinus. Recovery.

CASE 2. Headache, delirium, fever, right optic neuritis, suppuration, and carious bone in the right ear, tenderness over mastoid, and an abscess in front of the ear. At the operation a fistulous tract was found leading to an extradural abscess in the middle fossa. The dura did not pulsate; a puncture with a knife to a depth of 1½ *cm* gave no result. The autopsy showed a large abscess a *cm* still deeper, and a right-sided thrombosis.

CASE 3. A boy, two and a half years old, otitis after measles. The otorrhœa ceased and high fever and chills set in. Paracentesis and a simple mastoidectomy had no effect on the fever; the diagnosis of sinous thrombosis was then made, and verified at the operation. Death from sepsis. ZIMMERMANN.

325. A soldier, who had always suffered with otorrhœa, complained of one-sided headache for a number of years. At the time of the first attack of vomiting a moderate drooping of the left upper eyelid was noticed. The left mastoid is very tender and swollen, percussion on that side of the head is not tender; temperature normal, no slowing of pulse. The patient is slightly stuporous and incoherent, though no motor or optic aphasia. At operation the antrum was found to contain pus and granulations; no communication with the cranial cavity could be found and the search for the presumable abscess was postponed. On that night temperature and pulse rose rapidly, and death followed with the signs of pulmonary œdema. No autopsy, but the presence of the abscess was confirmed. The author believes that the perforation of the abscess was hastened by the concussion during the mastoid operation. He calls attention to the ptosis as an important symptom of abscess in the temporal lobe, and considers it to be due to pressure on the trunk of the third nerve.

NOLTENIUS.

326. The diagnosis was made from the following symptoms: right-sided suppurative otitis ; left-sided facial and hypoglossal paralysis; weakness of the left upper extremity with occasional convulsive attempts at pronation and supination; paresis of the left leg; left-sided lateral homonymous hemianopia; conjugate deviation of the eyes and of the head to the right. The operation was not permitted, and the autopsy confirmed the diagnosis.

POLLAK.

327. The author gives an exhaustive review of the symptoms of brain-abscess from ear origin based on nine cases observed at Kuhn's clinic. H.

328. The peculiarity of this case was a pronounced congestion of the collateral veins in the scalp. A case where long-standing ear trouble had led to an extradural abscess and a sinus-thrombosis. Both lesions were exposed at the operation; death, however, ensued from purulent meningitis. In addition, the autopsy showed that the thrombus in the transverse sinus extended into the longitudinal sinus, causing, according to LERMOYEZ, the distension of the cutaneous veins. ZIMMERMANN.

OTHER MIDDLE-EAR AFFECTIONS.

329. BARR, THOMAS, and NICOLL, J. H. A case of malignant tumor of the brain originating in the middle ear. *British Med. Jour.*, Oct. 16, 1897.

330. SMITH, S. MACCUEN. Chronic non-suppurative otitis media. *Atlanta Med. and Surg. Jour.*, Dec., 1897.

331. GUYE. Deafness following cicatrization of the membrana tympani. *Rev. intern. de rhin., ot., et lar.*, iii., 1897.

332. EITELBERG, A., Vienna. Remarks on the symptoms and treatment of middle ear-catarrh. *Wien. med. Presse*, No. 50, 1897.

333. GRUNERT. A new operative procedure to prevent adhesion of malleus to the labyrinthine wall after synechotomy and tenotomy. *Arch. f. Ohrenheilk.*, vol. xliii., p. 135.

334. GARNAULT, P. Surgical treatment of aural catarrh and tinnitus. Paris. A. Maloine, 1897.

329. BARR and NICOLL give a full report with illustrations of a very interesting case of malignant disease, in all probability sarcomatous, originating in the right middle ear of a boy, aged twelve and a half years. Pain and slight discharge had been present for three months before he was seen by Barr, who discovered a firm, very sensitive, and freely bleeding polypus filling the meatus. Removal was thoroughly effected, but the growth returned in four months, when it was again removed through the meatus. As recurrence took place, the antrum was opened and cleared of growth; soon after this grave symptoms arose which pointed to an abscess in the temporo-sphenoidal lobe. On Nicoll exploring the head, a hardish mass was felt under the

cortex, on dividing which a firm, grayish mass was exposed. The groove for the lateral sinus was also found occupied by firm, grayish granulation-like tissue. Death occurred two and a half months later. At the post-mortem examination the growth was found to be attached chiefly to the floor of the middle fossa, and to consist of two portions, one external to the skull being extension through the operation openings above and behind the ear of the main growth within the cranium; the other, or main mass, situated within the skull, appeared to be closely attached to the upper surface of the dura mater, which seemed almost intact, and was no doubt an extension from the middle ear; the clinical history showing that the extension of the growth upwards into the middle fossa was probably a much later event and followed also by more rapid progress. Barr quotes Bürkner's statistics, which indicate that carcinoma of the ear occurs only in the proportion of one in three thousand cases of ear disease; with regard to sarcoma, the proportion is still less. Barr also notes that in recorded cases of sarcoma, a polypoid-looking growth in the external meatus was observed in most of them when first brought under notice. CHEATLE.

330. Besides attention to the nose and naso-pharynx, SMITH advises that in chronic non-suppurative otitis media, incisions should be made in the membrana tympani extending along its whole length. Liquid albolene or the camphor-menthol solution can then be injected into the middle ear. All adhesions should be divided with a knife and traction made on the handle of the malleus. Subsequently massage of the drumhead and ossicles should be performed with Siegle's pneumatic speculum. Pilocarpine is given in some cases, while in others nerve tonics are administered. The author believes that excision of any part of the conducting apparatus is only justifiable when relief from severe tinnitus and vertigo is the object of treatment and other measures have failed. GORHAM BACON.

331. GUYE thinks it more favorable for an otitis to heal with permanent perforation, because otherwise each attack of naso-pharyngitis would cause fresh disturbance in the ear. In a lady who had had an otitis after scarlet fever six years ago, with dry perforation in both ears, whispering voice was heard in 9 *m.*

Should the drum-membrane cicatrize, with disturbance in hearing, permeability of the Eustachian tube must be examined for. A patient with dry perforation heard whispering in 9 *m;*

the perforation healed, and the hearing was reduced to 0.20 *m*. On passing sounds in the Eustachian tube, a closure near the tympanal opening, presumably caused by cauterization with silver-nitrate, was opened, and the old hearing power was regained. ZIMMERMANN.

332. According to EITELBERG, the usual methods of treating aural catarrh—catheter, Politzer's method, and rarefaction—are of equal value, but their action in the various cases is not the same. POLLAK.

333. The manubrium mallei is pushed outward by a bent probe introduced from in front. The wound of the drum-membrane then closes behind the handle, and the latter remains outside of the middle ear. Three cases of partially favorable functional result. BLOCH.

334. GARNAULT describes his method of retro-auricular operation in sclerosing processes. He believes that even in strongly ankylosed stapes, a considerable degree of hearing may be obtained. H.

INTERNAL EAR.

335. WILLIAMS, J. H. A clinical record of two cases of Ménière's disease, with remarks thereon. *Charlotte Med. Jour.*, Dec., 1897.

336. HUTCHINSON, J. Deafness from inherited syphilis. *Archives of Surgery*, July, 1897.

337. ALT, F., Vienna. The etiology of diseases of sound-perceiving apparatus. *Wien. klin. Rundschau*, No. 40, 1897.

335. CASE 1. Patient, fifty years of age, was struck by a branch of a tree while riding, and a twig penetrated the right membrana tympani. The accident was followed by persistent nausea and loss of perception of the direction of sound. The handle of the malleus was pushed upward and inward. Traction on the handle of the malleus gave great relief from the vertigo. The hearing was much affected.

CASE 2. Patient, twenty-eight, a carpenter, was struck by a nail which flew from under the hammer of a fellow-workman. The end of the nail lacerated the canal and caused a rupture of the drumhead. This was immediately followed by nausea, vomiting, and intense vertigo. When standing erect, the patient would have an inclination to fall toward the affected side. Phe-

nacetine was given to both patients, as it gave great relief from the nausea and vomiting. GORHAM BACON.

336. HUTCHINSON and LAIDLAW PURVIS agree that of those who suffer from congenital syphilitic deafness two thirds are females. The former states: "It is difficult not to suspect that some unrecognized law as regards hereditary transmission underlies these remarkable facts." On looking over the notes of 541 aural patients at King's College Hospital I find that 11 suffered with this form of deafness; 9 were females, and 2 males.

CHEATLE.

337. Among 182,779 ear cases ALT found that the internal ear was affected in 5.42 per cent. The ratio of the sexes was 70 men to 30 women. Alt found the following etiological factors in 42,736 patients of Gruber's clinic. Unknown cause, 30 %; professional cause, 14.8 %; combined with non-suppurative middle-ear processes, 8.9 %; meningitis, 7.2 %; congenital, 6.89 %; acquired syphilis, 5.4 %; typhoid fever, 4.8 %; purulent otitis, 4.4 %; hereditary syphilis, 3.1 %; cretinism and hydrocephalus, 2.4 %; scarlet fever and trauma, 2.6 % each; diphtheria, 1.7 %; mumps combined with retino-choroiditis, 1.03 %; with retinitis pigmentosa, 0.58 %; alcohol, quinine, salicylic acid, nephritis, small-pox, erysipelas, multiple sclerosis, fracture of base of skull, lightning. each 0.34 %. POLLAK.

NOSE AND NASO-PHARYNX.

a.—ANATOMY OF THE NOSE.

338. GOERKE, M. The glands in the nasal mucous membrane. *Arch. f. mikroscop. Anatomie*, vol. l., No. 4.

339. BRÜHL, G. New method to show the cavities in the nose and ear. Preliminary communication. *Anatom. Anzeiger.*, vol. xiv., No. 9.

340. ONODI, Prof. A., Budapest. A rare anomaly. *Monatschr. f. Ohrenheilk.*, No. 12, 1897.

338. GOERKE examined the respiratory mucous membrane in the dog, and found that mucous glands are absent, but that goblet-cells are frequent in the epithelium except in the lateral walls between the turbinates. In the latter place there are serous glands which resemble the parotid in structure. The glandular cells contain tingible granules in the protoplasm and the epithelial cells in the excretory ducts show distinct striation.

KRAUSE.

339. The method consists of injecting the open spaces with the known method of mercury and photographs with Röntgen rays. KRAUSE.

340. A posterior ethmoid cell extended deep into the posterior part of the orbital roof. KILLIAN.

b.—GENERAL PATHOLOGY AND SYMPTOMATOLOGY.

341. LICHTWITZ. The abuse and dangers of the nasal douche. *Sem. medicale*, No. 51, 1897.

342. HECHT, H., Heidelberg. The therapeutic use of electrolysis in the nose and throat. *Arch. f. Laryngology*, vi., 2.

343. DELAVAN, D. BRYSON. Method for the relief of certain enlargements of the turbinated bodies. *New York Med. Jour.*, Dec. 11, 1897; Amer. Laryng. Assoc., 1897.

344. PYNCHON, EDWIN. Nasal bougies and drainage-tubes. *New York Med. Jour.*, Oct. 23, 1897.

341. LICHTWITZ has abandoned all forms of nasal irrigation; he has met with the well-known sequelæ, headache and otitis, but also loss of smell after the use of disinfecting solutions. As the irrigation may be a cause for diseases of the accessory sinuses it should be discontinued. ZIMMERMANN.

342. HECHT has employed electrolysis in the treatment of sixty-six cases of various nasal lesions at Juracz's clinic, and was very much pleased with the results. The lesions include deviations and spurs of the septum, synechia, tumors of the nose and the naso-pharynx, reflex neuroses, ozæna, and various external affections of the nose. Though, according to the reviewer, many of these lesions could be treated by other simpler methods as well, the article is well worth careful study. ZARNIKO.

343. In subacute or chronic cases of engorgement (not hypertrophy) of the turbinated corpora cavernosa, DELAVAN introduces a lancet-pointed needle or minute knife obliquely through the mucous membrane, carried backward and parallel with the surface as far as the swelling extends. Not more than two punctures are to be made at one sitting. M. TOEPLITZ.

344. The tubes of red vulcanite are made perforate, in pairs, for either nostril, three inches in length for the adult, slightly irregular in curve both vertically and horizontally, and with a large perforation at the anterior end for introduction of a hook for removal. The turbinal side of the tube is concave, the septal

slightly convex, the vertical cross-section crescentic with blunted and thickened point showing a ledge at the upper and lower margins.

The bougies, made of two sizes, are solid and without perforations, but otherwise of the same dimensions as the drainage-tubes.

M. TOEPLITZ.

c.—OZÆNA.

345. RICE, CLARENCE C. Treatment of atrophic rhinitis. *New York Med. Jour.*, Nov. 20, 1897 ; Amer. Laryng. Assoc., 1897.

346. CASSELBERRY, W. E. Atrophic rhinitis, its nature and symptoms. *New York Med. Jour.*, Nov. 20, 1897; Amer. Laryng, Assoc., 1897.

347. AUCHÉ et BRINDEL. Bacteriology of atrophic rhinitis. *Rev. hebdom. de lar., d'otol.*, No. 41, 1897.

348. GRADENIGO, Prof. The treatment of ozæna. *Monatschr. f. Ohrenheilk.*, No. 11, 1897.

345. RICE reviews all the methods which have heretofore been recommended, such as with antiseptics, antitoxine, electricity, cotton plugs, bougies, inhalations, massage, cauterizations, sprays, and douches.

The object of treatment is cleansing, healing of ulcerations, promotion of adequate nasal respiration, and restoration of moisture. Cleansing is effected through cups with saline solutions, obstructions from the middle turbinal are removed by scissors, ulcerations are treated by frictions with stimulating disinfectants, lubrication is accomplished with oils. In cases with tendency to subacute inflammations, insufflation of powders is used.

The treatment ought to be constitutional also by advising out-of-door exercise and work. M. TOEPLITZ.

346. Different phases of the disease are of diverse or multiple causation. The majority of the cases are fœtid, the minority non-fœtid. Simple dry rhinitis is more frequently found in adults; ozæna, commencing in young subjects, leads to recovery after middle age. These types often blend one into the other. The disease is bilateral, except in cases with markedly deviated septum. Ozæna may be due to tuberculosis. Simple dry rhinitis is also found in alcoholic and gouty persons. Hypertrophy may precede atrophy in some cases of simple dry rhinitis of later life.

M. TOEPLITZ.

347. Investigations whether the atrophic rhinitides with and without ozæna differed bacteriologically. No definite conclusion was reached. In 20 cases Löwenberg's capsule bacillus was always found; in addition, the pseudo-diphtheria bacillus 18 times, the Pes-Gradenigo 3 times, staphylococcus 12, and streptococcus 4 times. In the 6 cases without ozæna the Pes-Gradenigo bacillus was wanting. ZIMMERMANN.

348. GRADENIGO used diphtheria antitoxin in ozæna without result; the action of intra-muscular injections of iodine were very satisfactory, though painful.

d.—SEPTUM.

349. THEISSING, H. Perichondritis and serous cysts of the nasal septum. *Inaug. Dissert.*, Breslau, 1897.

349. In the first part THEISSING treats of the traumatic affections of the nasal septum: simple fractures, hæmatoma, traumatic serous cysts, and abscess; of the last lesion the histories of a double and a single case are fully recorded.

The second part treats of the non-traumatic lesions: abscess (of unknown origin), serous perichondritis of the nasal septum, serous cysts with history of a case with sudden appearance of a double serous cyst and evacuation of a clear fluid on puncture six days later. H.

e.—ACCESSORY CAVITIES.

350. POWER, D'ARCY. Empyema of the antrum (maxillary) in a child aged eight weeks. *British Med. Jour.*, Sept. 25, 1897.

351. BRYAN, J. H. Treatment of chronic frontal sinusitis. *New York Med. Jour.*, Oct. 2, 1897; Amer. Laryng. Assoc., 1897.

352. LOCKHARD, J. B. Transillumination; its fallacy as a diagnostic means. *New York Med. Jour.*, Nov. 27, 1897.

353. GAUDIER. A case of tubercular empyema of the maxillary sinus. *Revue hebdom. de lar., d'otol.*, No. 44, 1897.

354. BOENNINGHAUS, G., Breslau. Resection of the facial and nasal walls of the maxillary sinus with implantation of the nasal mucous membrane in obstinate cases of empyema. *Arch. f. Laryngol.*, vi., 2.

350. A wasting boy, aged eight weeks, came to D'ARCY POWER at the Victoria Hospital for Children with a discharging abscess at the lower part of the right lower eyelid. The right

side of the face was somewhat fuller than the left, and the skin of the lower eyelid and cheek was red and hot. A considerable quantity of pus could be squeezed out by pressure upon the cheek, and on looking into the mouth a small quantity of pus could be seen exuding from the alveolar border. A probe passed along the sinus in the cheek showed that the upper part of the superior maxilla was bare. Power enlarged the sinus, scraped away some granulation tissue, and made an opening through the floor of the antrum, so that a drainage tube could be passed from the eyelid into the mouth. About a drachm of pus came away at the operation. Forceps had been used at birth, producing bad bruising of both sides of the face, the right more than the left. At one month there was some difficulty in closing the mouth, and the bottle was refused; about the same time redness and swelling appeared below the right eye, an abscess subsequently forming. Death occurred ten days after the operation.

CHEATTLE.

351. The combined affections of the sinuses are brought about by extensions through the bony partitions, or directly through anomalous passages. The infundibulumis often continued as a half tube and terminates directly in the maxillary foramen. BRYAN advocates an operation from without according to Ogston and Luc with a small crowned trephine just outside the median line above the supraorbital ridge. The fronto-nasal duct is enlarged by passing a trocar into the nose and a self-retaining rubber drainage is introduced. A woman, aged fifty-eight, after the left antrum of Highmore was opened from second molar, and anterior ethmoid cells and loose spicula of bone contained therein were curetted, was thus operated. On eighth day after operation the drainage tube had slipped out, and an abscess in lower half of line of incision had to be opened. The patient made a good recovery. M. TOEPLITZ.

352. LOCKHARD outlines the most important anatomical conditions with their effect upon the transmission of light. Typical antral cavities are the exception. The variations are as follows: (a) the floor of the maxillary antrum lies lower on one side than that of the nose, while the opposite may be normal; (b) the facial wall may be thin on one and thick or diploic on the other side; (c) one sinus may be entirely absent; (d) the antrum of one side may be filled with fatty bone tissue or with compact bone; (e) both facial walls may be unusually thick; (f) protuberances into

the antrum from neighboring bone; (g) one antrum may be divided by horizontal bony septum into two distinct cells; (h) contraction of the sinus by sinking of the walls. In the frontal sinuses many irregularities are also observed. Besides a typical position of the septum an accessory septum is found at times; rarely one cell is absent, the walls thickened and at different planes. The two cavities communicate one with the other, or with that of the orbit and ethmoid sinus. A frontal cell may be occupied by a large anterior ethmoidal cell.

Transillumination will uphold a diagnosis which has been made, but alone it is not infallible. M. TOEPLITZ.

353. The tubercular nature was established with the microscope and inoculation. It presented the typical picture of empyema with swelling of the lower turbinate and polypi. Puncture through the alveolus was unsuccessful, and a broad opening through the canine fossa was made, and typically tubercular granulations were scraped away. General condition was much improved. A small fistula in the gum remained.

ZIMMERMANN.

354. BOENNINGHAUS comes to the following conclusions: 1. Many cases of antral empyema can be successfully treated from the natural opening, the alveolus, or the lower nasal passage. 2. A part of the cases which do not do well under this treatment can be cured by a broad opening in the ant. wall from the mouth and local curettage. These are cases where the mucous membrane is diseased in one region, usually from a carious tooth. 3. The remainder do not heal; the entire mucous membrane is diseased. A broad opening must be made, and all the mucous lining curetted. The bare bony wall can then only be brought to epidermatize by resecting the nasal wall and implanting the nasal mucous membrane. ZARNIKO.

f.—TUMORS.

355. SUTTON, J. BLAND. Notes on some unusual cases of tumors. *Practitioner*, Nov., 1897.

356. WRIGHT, JONATHAN. Papillary œdematous nasal polypi and their relation to adenomata. *New York Med. Jour.*, Nov. 13, 1897; Amer. Laryng. Assoc., 1897.

357. HOPKINS, F. E. Adeno-carcinoma of the nose. *New York Med. Jour.*, Nov. 13, 1897.

358. LELAND, G. A. Adeno-carcinoma of the nose. *New York Med. Jour.*, Nov. 13, 1897; Amer. Laryng. Assoc., 1897.

359. BARRETT, J. W. Sarcoma of the nose. *Intercolonial Medical Journal of Australasia*, Oct. 20, 1897.

360. KUHN, Prof., Strassburg. Angioma of the nose. *Biblioth. d. Gesammt. medic. Wissenschaften.* Teschen, 1897.

361. KUHN, Prof. Carcinoma of the nose. *Ibid.*

362. HELLMANN, L., Würzburg. Hard papilloma of the nasal and frontal sinus mucous membrane. Transition to carcinoma. *Arch. f. Laryng.*, vi., 2.

355. In describing dermoids arising in the internasal fissure, BLAND SUTTON points out that those which occur on the bridge of the nose differ in some particulars from those which are met with near the tip; the latter are always situated in the middle line, appearing most commonly only as a narrow recess lined with hair, which may be long enough to project beyond it; occasionally they assume the familiar tumor-like shape; these recesses are in all probability due to incomplete fusion of the globular processes; he states that they are very common, more frequent in men than in women, and rarely require treatment; their mode of origin and characteristics agreeing with the hair-lined recesses so common in the neighborhood of the coccyx, and known as post-anal dimples. The former, occurring on the bridge of the nose, arise in the same manner as those which occur on the scalp, more especially in the neighborhood of inion and bregma.

ARTHUR CHEATLE.

356. WRIGHT examined two growths taken from the nose, one consisting of papillary masses of long standing with tendency to recurrence, the other, of pinkish-gray cauliflower masses. External configuration shows numerous finger-like processes, which are microscopically explained. The proliferation goes on upon the surface as well as in the glands. Adeno-carcinoma of the nose, in many places, cannot be distinguished microscopically from papilloma. The gradations in development from mucous polypus through benign adenomatous growth into a malignant tumor can thus be well studied. M. TOEPLITZ.

357. HOPKINS' patient, aged eighty-three, suffered for twelve years from obstruction of left nostril, which, after six years' standing, became entirely occluded so as to push the septum over to the right. There were brownish masses in vestibule and a gray slough was hanging down from left choana. The micro-

scopical examination by Dr. Jonathan Wright revealed the masses to be made up of cylindrical epithelium, arranged in form of tubules and acini at some places, at others crowded in irregular masses, but with a general tendency to concentric arrangement. There follows a table of twenty-three recorded cases and general remarks upon statistics, symptoms, diagnosis, and treatment by Wright. M. TOEPLITZ.

358. LELAND'S patient, female, aged fifty, exhibited obstruction of right nostril by a large tumor, which developed more rapidly after partial removal. Inner canthus of the right orbit was swollen and showed fistula discharging pus. Right eye was pushed to the right, and bulging. Nares and naso-pharynx were filled with the firm, grayish-white masses. A cellulitis developed under the right zygoma and extended to the roof of the mouth. Patient died and the autopsy was made by Dr. Councilman. On stripping the dura from the orbit a small amount of pus welled up. Cribriform process was eroded. Masses in the nose appeared to spring from all the processes of the ethmoid which was destroyed. Tumor grown into septum, through anterior wall of antrum into the cheek, connective tissue, and muscles of the latter; tissues back of right, and somewhat of left orbit infiltrated. Metastasis in pleura; general amyloid degeneration. General infection with streptococcus pyogenes. Tumor was adenoma with tendency to carcinoma. M. TOEPLITZ.

359. At a meeting of the Medical Society of Victoria, Australia, BARRETT related the case of a woman who suffered from "stuffy nose" for five years, and protruding polypi for three years; after removal with snare and cautery, headaches and a limpid discharge from the right side of the nose came on, later there was marked proptosis, œdema, and redness of eyelids, and conjunctival injection. A hard, not vascular, growth was then found on the right side, projecting into the naso-pharynx. Examination of snared portions showed it to be sarcomatous. After ligating the external carotid and performing tracheotomy, the growth was removed together with part of the superior maxilla, the palatal plate being preserved. CHEATLE.

360. KUHN thinks that the present practice of designating angiomata as "bleeding polyp of the nasal septum" does not agree with the anatomical description of the tumor. This term is unnecessary, as the tumor is a cavernous angioma. The structure of the tumor is described and illustrated. H.

361. Carcinoma of the nose is much rarer than sarcoma. According to Garth, in over 11,000 carcinomas of the various parts of the body, there were only 4 of the nose and the accessory cavities. In 28,000 nose and throat patients there were 10 sarcomas and 2 carcinomas of the nose. H.

362. HELLMANN gives a careful history and description of a case of hard papilloma of the septum. The patient, forty-six years old, had suffered for twelve years with recurring tumors of the right nasal passage, which were repeatedly removed and called hard papilloma. In 1895 he was referred to the author, as an empyema of the frontal sinus was suspected. After removal of large tumor-like masses the empyema was found to be present together with double choked disc. Both frontal cavities were opened. In the left, pus and numerous papillomas were found; in the right, mucous membrane fairly normal, inspissated mucus. After the operation, euphoria. Choked discs remain. Two weeks later renewed headache, weakness, and clonic spasm in the right-sided extremity. Cerebral symptoms aggravated. Right beginning optic neuritis. At a second operation, two weeks later, both frontal sinuses are freely exposed, the nasal wall is perforated, many tumor-masses are removed from the frontal and ethmoidal sinuses and the nasal meatus. The bony nasal septum is necrosed and perforated by the tumor. The microscopical examination showed that the tumor was partly hard papilloma and partly epithelial carcinoma. The tumor recurred, and death ensued in three weeks. The author believes that the tumor originally was papillomatous and later became carcinomatous. ZARNIKO.

g.—OTHER AFFECTIONS OF THE NOSE.

363. JANKELEVITSCH. On nasal hydrorrhœa. *Rev. hebdom. de lar., d'otol.*, No. 51, 1897.

364. GAREL. Uncommon fractures of the nose, with necrosis and extrusion of the inf. turbinate. *Ann. des mal. de l'or., du. lar.*, No. 10, 1897.

363. JANKELEVITSCH adds eight cases to the eighteen collected by Bosworth. Aside from the secondary form of nasal hydrorrhœa which accompanies polypi, diseases of the sinuses and central disturbance, there is a primary form not to be mistaken for hay-fever and other nervous coryzas. The author considers it to be a vaso-motor disturbance. The treatment consists in daily massage. ZIMMERMANN.

364. A similar case to the one published by Freytag in 1896. A girl, fourteen years old, was struck on the right side of the nose by a ball. Purulent discharge set in. Two years later a foreign body was discovered, which proved to be the necrotic lower turbinate. ZIMMERMANN.

h.—PHARYNGEAL TONSIL.

365. McBRIDE and LOGAN TURNER. Naso-pharyngeal adenoids. A clinical and pathological study. *Edinburgh Medical Journal*, vol. i., new series, pages 355, 471, 598.

366. KUHN, Prof., Strassburg. Adenoid vegetations. *Bibliothek. der Gesammt. med. Wissensch.* Teschen, 1897.

367. KAYSER, R., Breslau. Diseases of the lymphatic ring. *Handbuch der Laryngol. u. Rhinologie.* Wien, 1897.

368. BARTH, A., Leipzig. Pharyngeal tonsil and ear. *Monatschr. f. Ohrenheilk.*, No. 11, 1897.

369. CHOLEWA, Berlin. The operative removal of adenoid vegetations. *Monatschr. f. Ohrenheilk.*, No. 12, 1897.

370. LENZMANN, R., Duisburg. The operation for adenoids and the narcosis. *Therap. Monatsch.*, No. 9, 1897.

371. LEYSER, Darmstadt. The narcosis in operations on adenoids. Verein hessischer Aerzte. *Ibid.*, No. 12, 1897.

372. OLLENDORF, Barmen. The same. *Ibid.*, No. 12.

H. NAEGELI—AKERBLOM. Rütli. The same. *Ibid.*, No. 10.

365. McBRIDE and LOGAN TURNER have made an interesting and instructive analysis of 500 cases.

The following is a table of the number of patients at different ages:

0	to	5	years	.....		57
6	"	10	"	.....		141
11	"	15	"	.....		115
16	"	20	"	.....		86
21	"	25	"	.....		38
26	"	30	"	.....		24
31	"	35	"	.....		18
36	"	40	"	.....		4
41	"	45	"	.....		1
46	"	50	"	.....		4
				Total	.....	488

They have never met with adenoids growing from the margin of the choanæ or Eustachian tubes, but they may be met with in Rosenmüller's fossæ. The sessile, ridged form is invariable in their experience; in this all will agree with them who remove the mass with some form of Gottstein's curette, such as Delstanche's modification.

The following are their conclusions from histological examination:

1. That the ciliated epithelium may be converted into the stratified squamous variety, and the latter may become much thickened as the result of intermittent pressure to which the hypertrophy is subjected.

2. That this change tends to occur in the smaller naso-pharnyx of the young child.

3. That the cilia may become destroyed over large areas and the epithelium thinned to a varying degree; and, further, that emigration of leucocytes is not general.

4. That there is a tendency to an overgrowth of fibrous tissue, which commences in and around the blood-vessels, and gradually invading the lymphoid tissue leads to shrinking of the growth.

5. That this process is not confined to the period at or after puberty, but occurs also in very young children, and is therefore independent of the age of the patient.

366. A concise general treatment of adenoids.

367. An excellent and exhaustive treatment of the subject, giving the present position on all questions relating to adenoids.

368. BARTH does not practise digital examination. He prefers Beckmann's curette and the cold snare. Thirty per cent. of the patients with adenoids had ear troubles. KILLIAN.

369. CHOLEWA also prefers Beckmann's curette to Gottstein's, though the particles are liable to remain hanging to the post. pharyngeal wall. In children under one year he uses Hartmann's curette. KILLIAN.

370 to 372. This is a discussion as to the merits of narcosis in operations on adenoids. LENZMANN and OLLENDORF operate with narcosis, LEYSER and NAEGELI without. MANASSE.

SOFT PALATE, PHARYNX, AND BUCCAL CAVITY.

373. MYLES, ROBERT C. Basal and basi-lateral diseases of the faucial tonsils. Meeting of the Section of Laryngology of Academy of Medicine, New York, Dec. 23, 1897.

374. HARTMANN, J. H. Angioma of the tonsil. *New York Med. Jour.*, Dec. 25, 1897.

375. HUGUES. Chronic abscess of the tonsils. *Rev. hebdom. de lar., d'ot.*, No. 44, 1897.

373. MYLES denies the frequency of adhesions of the pillars to the faucial tonsils. He dwells particularly upon hypertrophy at the base or on the sides of the tonsils, basal or basi-lateral hypertrophies, which push out the tonsil, carrying with it the pillars and giving the appearance of adhesions. He uses for their dissection from the sheath delicate knives. Small hypertrophies are removed by means of Myles's lateral punch forceps. Three appended cases, one of which has especial bearing upon the formation of peritonsillar abscesses, are fully described, and they illustrate the conditions and the methods for their relief.

M. TOEPLITZ.

374. HARTMANN'S first case occurred in a woman, aged twenty-eight, in whom the growth occupied the lower two-thirds of the right tonsil. In the second case, that of a man, aged thirty-two, the entire surface of the left tonsil was occupied by a large mass of an angiomatous outgrowth, which was nodular and irregular in outline, of dark purplish color, and of about the size of a pecan nut. It was slowly removed with wire écraseur, but a profuse bleeding took place after twenty-four hours. The growth returned after three years at the lower third of the tonsil. Microscopically, it consisted of capillary blood-vessels with thin or thickened walls, which were imbedded in a stroma of connective tissue. M. TOEPLITZ.

375. HUGUES differentiates between the epithelial detritus and tonsillar stones occurring in the crypts and abscesses developing in closed follicles. These are sequelæ of inflammations in the tonsillar tissue and show fistulous tracts. The tracts are often difficult to find as they open in front and back toward the posterior palatal arch. If the fistula can be found, it should be opened up with galvano-cautery and painted with iodine on the following day; if no fistula can be found, the tonsil should be removed. Four cases are briefly described. ZIMMERMANN.

REPORT OF THE TRANSACTIONS OF THE SECTION ON OPHTHALMOLOGY AND OTOLOGY OF THE NEW YORK ACADEMY OF MEDICINE.

By Dr. W. B. MARPLE, Secretary.

OTOLOGICAL PART OF THE MEETING OF MAY 16, 1898.

The President, Dr. E. Gruening, in the chair.

The evening was devoted entirely to the presentation of clinical cases in otology.

Dr. E. B. Dench.—**A Case of Ossiculectomy, Wounding of Jugular Bulb, Septic Thrombosis of the Internal Jugular. Operation. Recovery.**

The patient was a young woman who had suffered from a purulent otitis from childhood. The right ear had undergone spontaneous cure, but the left ear had continued to discharge at intervals. An examination of the left ear showed distinct caries within the tympanic cavity, and I, therefore, advised the removal of the ossicles. This operation was performed, and the malleus and incus removed; both were carious. Areas of softened bone were also found both in the tympanic vault and on the internal tympanic wall. After the ossicles had been removed and the curette freely used, a *bluish mass was seen in the floor of the tympanum.* Upon touching the mass with the probe, it was found to yield to pressure, as if filled with fluid. It was immediately recognized as the *bulb of the internal jugular vein*, its exposure being due to a defect in the floor of the tympanum, either the result of caries, or an anomalous anatomical condition. Despite great care in using the curette, the bulb was punctured, and rather free hemorrhage followed. This hemorrhage was easily controlled by packing with strips of sterile gauze. When all carious bone

had been removed, the patient was returned to bed. Two days after the operation, the packing from the canal was removed. Although this was done very gently, considerable hemorrhage occurred, so that it was necessary to reapply the tampon. The temperature remained normal until the fourth day, when it began to rise steadily, and in the evening was 103.8°. The patient showed distinct evidences of severe constitutional infection. There was slight tenderness on pressure, just below the tip of the mastoid along the anterior border of the sterno-mastoid muscle. This sign had been carefully watched for, and only appeared on the fourth day after operation. The case was seen in consultation, by Dr. Abbe, who agreed with me, as to the probable presence of a septic thrombus in the internal jugular vein, and also concurred in the opinion that immediate operation was necessary.

With the assistance of Dr. Abbe, I operated the same evening. An incision was made along the anterior border of the sterno-mastoid muscle, extending from the level of the cricoid cartilage to the tip of the mastoid. From this point it was continued parallel to the line of the insertion of the auricle, to a point just above the superior wall of the meatus. The internal jugular was then exposed in the neck, and at the lowest point of the incision was found to be perfectly healthy. Just below the juncture of the facial with the internal jugular, a double ligature was passed about the latter vessel; the facial was divided between two ligatures, close to the point where it entered the jugular. I next entered the mastoid antrum in the usual way. The mastoid cortex was exceedingly dense, and the antrum small. The lateral sinus was then exposed at its sigmoid portion and followed downward toward the jugular bulb, and upward for a short distance along its horizontal portion. The sinus was found to be perfectly normal. The internal jugular was then followed upward towards the bulb. At a point about one-half an inch below the jugular fossa, the wall of the vein was thickened, and its lumen was occluded by a thrombus. A ligature was passed about the vein as high up as possible and securely tied. The vein was then divided low down in the neck between the two ligatures already mentioned, and the upper segment, about 2½ inches long, excised. In attempting to remove the jugular process of the occipital bone, the jugular bulb was accidentally wounded. Free hemorrhage took place, showing that there was no interference with the circulation at this point, and that the thrombus was localized. In order to

secure perfect drainage of the middle ear, the posterior wall of the meatus was broken down, thus converting the middle ear, the mastoid antrum and the external auditory canal into one large cavity. The lower portion of the wound was closed with a continuous catgut suture, the remainder being left open. The wound and external auditory canal were then packed with iodoform gauze, care being taken to isolate the exposed meningeal area as much as possible from the middle ear by means of iodoform gauze packing. The parts were then covered with several layers of sterile gauze and a bandage applied. The temperature immediately fell to 100°, and from this time never rose above 101°. The first dressing was removed on the fourth day, and the wound found to be in a perfectly satisfactory condition.

The patient made an uninterrupted recovery.

Dr. ROBT. G. LEWIS presented a case of **Cholesteatoma Complicating a Bezold's Mastoiditis;** operated upon by the Schwartze-Stacke method.

The patient twenty-five years of age, female, presented herself February 28, 1898. Otorrhœa, since early childhood. At times, the discharge would apparently cease for a few weeks or months, to be followed by severe pain and an active discharge.

When seven years of age, patient swallowed a pin. In her fourteenth year an abscess developed in the neck, which opened about an inch below the tip of the mastoid process. The discharge from the abscess was very profuse and in this discharge a "rusty pin was found." The abscess healed in a short time.

December last the patient caught cold and along with it developed an unusually severe pain in the mastoid. A week later, at the seat of the former "pin abscess," another abscess developed and opened spontaneously; the pus was very offensive and profuse.

On her first visit, Dr. Buck saw her; he found tenderness on pressure over the mastoid, but little œdema; a small pouting ulcer existed an inch below the tip of the mastoid process; on exploring with a probe it passed upwards for over two inches through the tip of the mastoid process; the external auditory canal was inflamed and stenosed; in its posterior wall was an opening which led into the mastoid cells.

On March 4th I operated. I found the mastoid process was composed of a single cavity, the bone being simply a shell, and lying in it like a kernel in a butternut was a cholesteatoma as

large as a large-sized olive. On removing this I found a perforation in the digastric groove of the mastoid process, which opened into a sinus leading to the ulcer on the neck ; another one, about two by three millimetres, opened into the midle cerebral fossa ; a third, about the same size, opened into the sigmoid sulcus ; a fourth, of considerable, size opened into the external auditory canal. I removed all suspicious bone, including the entire upper and posterior wall of the external auditory canal. The membrana tympani as well as the ossicles were destroyed. Before completing the operation, my patient's heart grew weak and I was compelled to dress the case and have her placed in bed. The facial nerve was not injured. March 14th I curetted all the tissues involved, but did not find it necessary to remove any further bone. I then divided the cartilaginous external auditory canal into a posterior and an anterior flap ; the posterior flap I turned inwards at right angles and sutured it to the posterior edge of the postauricular incision. I then united with sutures the two edges of this incision, inserted a strip of gauze through the opening of the external auditory canal into the large cavity which I had made, and which consisted of the external auditory canal, the tympanic cavity, and the mastoid cells. Facial nerve injured with marked facial paralysis.

At the first dressing I found I had obtained primary union with the exception of a quarter of an inch at the lower angle of the wound.

May 16.—Complete epidermitization of the cavity has not been obtained as yet, but will probably be in another few weeks. A slight discharge is still present. The facial paralysis is much improved, and when the patient's face is in repose can not be seen ; I think it will gradually disappear.

The CHAIRMAN said that we see cases where the process of disease caused a persistent opening in the canal ; cases which have been under observation for years, throwing off cholesteatomatous masses from time to time. It is preferable to have an opening in the canal. .

Dr. F. WHITING presented a case of **Extradural Abscess with Extirpation of the Petrous Pyramid.**

A child of two years was brought to the New York Eye and Ear Infirmary in March. It had been operated upon two months previously at Hudson Street Hospital for mastoiditis of the left side.

Physical examination shows meatus of A. D. filled with pus and the posterior wall of the membranous canal collapsed, obscuring view of fundus.

Mastoid aspect presented a large, irregular wound, the granulations upon the edges of which were sloughing, and bathed in an ichorous discharge. There protruded through these granulations a considerable area of necrosed and blackened bone.

Facial paralysis was complete.

Upon enlarging the opening in the mastoid and retracting the flaps, the periosteum was found to be extraordinary thick and very firmly adherent; the cortex of the entire apophysis was necrosed. By employing gentle traction three large sequestra were removed, one of which was 1½ inches long by ½ inch in the other dimensions. This fragment in its normal state had constituted the major portion of the superior and posterior surfaces of the petrous pyramid, and extended upon its upper surface to the apex of the pyramid. The two remaining sequestra and the carious bone removed in addition by curetting, comprised practically all of the mastoid and petrous bones. The carotid artery was exposed by the removal of the bony walls of its canal, and the trunks of the auditory and facial nerves were uncovered at the internal auditory meatus.

The sigmoid sinus, from the knee to the jugular foramen, lay in the wound, and although its walls were thickened from periphlebitis, no exploratory puncture of them was made because of the absence of any symptoms of sinus involvement. The caries of the temporal bone was so extensive that it was necessary to remove a large part of the squama forward and downward to the temporo-sphenoidal suture.

The exposure of the base of the brain after the operation was very extensive.

There was no reaction from the operation, and healing was undisturbed and complete. The tissues submitted to the pathologist were examined by Dr. Dixon, who reported them as not tubercular.

Discussion.—Dr. GRUENING asked the opinion of the Section as to the advisability of removing granulations from the sinus. He thinks these granulations are oftentimes a barrier to the invasion of the sinus by micro-organisms. He has, in his recent cases, refrained from interfering with them except when they are on the dura mater.

Dr. H. KNAPP said that he had presented to the Society a case in point a year ago. There had been extensive caries of the bony parts, and the wall of the sigmoid sinus had been covered with blackish-red granulations which were necrosing. These he had scraped away, and the case had done well.

Dr. MCKERNON said that he had always removed granulations from the sinus with a dull curette. One case he had seen where they had not been removed. The case subsequently came under his care, and did better after the removal of the granulations.

Dr. WHITING said it had been his custom to remove the granulations after having cleaned the wound thoroughly. He believes that where he had removed these partly necrotic granulations from the sinus walls his results had been better.

The CHAIRMAN said that it was a question sometimes whether the granulations were necrotic (and consequently to be removed) or healthy.

Dr. J. F. MCKERNON presented a case of **Operation for Subdural Abscess.** Patient, aged thirty, with history of O. M. P. A. following severe cold and sore throat, five weeks previously. Profuse purulent discharge from right meatus, with supero-posterior wall of canal collapsed and bulging. Mastoid exquisitely tender. Pain was also pronounced over the right temple, and radiated backward over the side of head and occiput. Operation. Apophysis necrotic, removed. Necrosis extended an inch beyond sinus, which was exposed one inch and a half downward from its bend toward the bulb. Sinus aspirated twice, contents normal. Roof of antrum carious, and removed over an area of an inch. Dura dark, incised, and a grooved director passed upward and forward into middle fossa, followed by discharge of pus, about four drachms. Tegmen tympani subsequently found to be soft, and probe passed into abscess cavity. Cavity syringed with 1 : 10,000 sublimate, and dressing applied. Patient made a good recovery. A chill and rise of temperature on day following operation was found to be due to attack of acute tonsillitis.

Dr. H. KNAPP presented a case of **Perichondritis of the Auricle.** The patient, when first seen, showed a doughy swelling on the anterior edge of the antihelix. No pain, no injury. Incised, with escape of viscid liquid. Pressure bandage applied. In a few days swelling larger than before. Again freely incised and packing with sterilized gauze; pressure bandage. In the

following days the whole auricle, except lobula, swollen, red, and painful. On removing dressing pus escaped. Auricle now transfixed with a scalpel; gauze wick passed through opening. Swelling and discharge soon diminished, and recovery without deformity now seems assured. Was well six weeks later; no deformity.

Dr. COBURN presented a similar case, incised and packed, then pinna pierced and wick passed through. Probably due to traumatism. Good recovery without deformity.

Dr. WHITING presented a case of perichondritis of three months' standing. No history of any traumatism, nor exposure to great cold or heat. He sterilized the parts, and drew off (by means of a hypodermic needle) the contents, consisting of straw-colored fluid, and then, through the same needle puncture, he *injected Lugol's solution* until the walls of the cavity bulged. The result was extremely satisfactory. There was quite sharp pain in the auricle for an hour, but otherwise not the slightest reaction. Six weeks afterwards the cure was complete without discoloration or deformity.

He presented this case because it had been stated in some text-books that this mode of treatment was *not* to be pursued.

Dr. TYSON said he had had good results from swabbing with tinct. iodine and then pressure.

Dr. MCKERNON had treated these cases at first in a manner similar to that of Dr. Knapp. Then he had aspirated and injected 5 % formaline. Then covered with white precipitate ointment and applied pressure. One of his assistants had informed him that the white precipitate alone was used successfully in Vienna.

Dr. FELIX COHN had treated a case first by incising and packing. No result after five weeks. Then he inserted a drain (tube or gauze), and case did well.

Dr. KNAPP said these cases were not uniform. Some came from middle-ear suppuration, others were idiopathic; many, especially the hemorrhagic form, were traumatic. They were well known to the boxing fraternity. He had recently seen a case which quickly recovered with pressure only. He had of late followed the treatment first advised by Dr. Gruening, that of transfixing the auricle and draining from both sides. He was glad to learn that aspiration and injection of Lugol's solution also gave good results.

The CHAIRMAN said that Dr. Knapp was right in stating that

these cases are not all alike. Some are not serous but purulent, and these latter cases do better by transfixion (even multiple transfixion), but with this must be associated drainage.

Dr. DENCH said he had recently seen a case with considerable swelling. He arranged for operation, but case got well. Spontaneous absorption in these cases is rare, according to his experience.

Dr. M. TOEPLITZ showed some cases of **Otorrhœa Cured by Radical Operation and Other Measures.**

CASE 1. Patient, aged thirty-five, with chronic otorrhœa, left ear. Had an exacerbation associated with mastoid tenderness. He removed carious bone from attic, mastoid, and inner wall of tympanum, and split external meatus horizontally. Four and a half months subsequently, patient was cured with a persistent post-auricular opening.

CASE 2. Patient, aged twenty-four, O. M. P. C., left, since childhood. Here caries of ossicles and aditus was found, the external meatus was split horizontally into two flaps (Panse modified). Complete facial paralysis, lasting ten weeks. Perfect cure of case in three months and a half.

CASE 3. Aged eighteen, O. M. P. C., exenteration of tympanic cavity from external meatus. Complete recovery in six weeks.

CASE 4. Patient with acute otitis with mastoid involvement. Operation on mastoid, repeated in two weeks; a third operation in two weeks; and finally, a week later a fourth, as radical as possible, into aditus ad antrum. After-treatment lasted more than two years. Tubercular ostitis of mastoid.

Dr. E. GRUENING presented a case of *a*, **Streptococcus Mastoiditis Followed by Erysipelas.** The patient, a young man, had an intra-nasal operation performed on the left side and began to suffer from pain in the right ear a few days later. The right drum was pierced and the ear discharged freely, but continued to ache. On admission to the ear wards of the Mt. Sinai Hospital the man appeared to be very much prostrated and complained of intense headache. The right external auditory canal was filled with fluid pus, and both sides of the nose contained muco-pus. The mastoid was very tender both over the apex and antrum. Cultures of the nasal and aural pus showed pure streptococcus, the cocci presenting themselves in short and long chains. The mastoid cells were opened and found to contain pus of the same nature. The destruction of bone tissue in the mastoid was very extensive, reaching far backward over the sigmoid sinus, one inch

of which was exposed, after the removal of the diseased bone tissue. After the operation the temperature was 99.6°, pulse 70. The next morning the temperature rose to 102°, and in the course of the day to 103.4°, and in the evening to 104.2°, with a pulse of 92. The wound looked well, the sinus was soft and the high temperature could not be accounted for. The following day the temperature was still 104.4°, and on removing the dressing it was found that the auricle and adjacent part of scalp and cheek were red and œdematous. In the course of the following four or five days the temperature remained high and the redness and swelling of the skin extended over the nose, to the left side of the cheek, and down the nape of the neck. The patient was treated in the isolation house of the Hospital with 60 % ichthyol and made a good recovery from the attack of erysipelas in about ten days. There was no case of erysipelas in the Hospital at the time of admission, and we must assume in the case an auto-infection. It is quite possible that the cases of erysipelas on record in connection with ear disease occurred in streptococcus otitis.

b. **Mastoiditis with Cholesteatoma in a Child.** This boy is eight years of age. He has had a discharge from his right ear as long as he can remember. Four weeks ago a large swelling appeared behind the ear. In one of our dispensaries an incision was made, and pus evacuated. Inasmuch as the wound showed no tendency to heal, he applied to the *Mt. Sinai Hospital* for admission. Here the regular mastoid operation was performed. The cortex was found to be much diseased and perforated at various points. The antrum cavity was very large and reached to the apex, and this whole space was filled with cholesteatomatous material. The table covering the sigmoid sinus formed a sequestrum measuring 20 *mm* in length. The sinus was covered with villous tough granulations. These were not removed. The presence of an extensive cholesteatoma filling the whole mastoid cavity of the child is of considerable interest.

The CHAIRMAN asked for expressions of opinion from members of the Section : (1) as to whether it is legitimate, where no indication of sinus trouble is present, to expose the sinus during the mastoid operation, so that, if subsequently the sinus becomes involved, the trouble can be reached more easily and promptly. (2) In post-aural abscesses in children it has been held that simple incision is adequate. In his experience, such treatment had rarely been sufficient, such cases requiring an operation on the mastoid process.

Discussion—Dr. WHITING said he had had a case where there was external otitis ; he had incised the furuncles in the canal and afterwards had done a mastoid operation where the flaps became subsequently widely infiltrated. In this case he had felt sure that the infection had come from the furuncles.

Dr. DENCH said that one cannot lay down any general rule in reference to opening of sinus. In a general way, he would answer Dr. Gruening's question in the negative, but if the technique is correct, exposure of the sinus can do no harm. He insists that the packing of the mastoid area over the seat of infection should be entirely separate from that of the portion of the wound where the dura is exposed. Nature does this when the soldering of the membranes takes place, limiting a meningitis, for example ; one should follow the same rule as much as possible in opening the brain. I limit the risk of infecting the dura. But it is not difficult to open the sinus at a subsequent operation. Personally he would prefer to do this only when symptoms arose indicating sinus involvement.

Dr. H. KNAPP said that he was guided by the aspect of the inner table. In recent cases, where this latter is white and eburnated, he lets it alone, and his results have been good. If the bone is brittle, it is oftentimes of benefit to open the posterior fossa, even the middle. In a case of influenza otitis with symptoms of acute meningitis, he opened both cavities and the dura appeared healthy. But two days later the dressings were soaked with abundant foul-smelling pus. His prophylactic opening had probably saved the patient's life, making a channel for the evacuation of a collection of pus which the operation had failed to reach.

Dr. WHITING said that his cases of cholesteatoma had always been in adults, and either in the tympanic cavity or antrum.

Dr. FELIX COHN said he had had a case of cholesteatoma in a boy seven years old.

Dr. MCKERNON said his experience with cholesteatoma had been limited to adults.

Dr. DENCH had had one case, æt. eighteen, where the antrum and mastoid were filled with cholesteatomatous masses.

Dr. WENDELL PHILLIPS had recently operated on a boy æt. fourteen. He had removed the mastoid cortex, and then found a cavity filled with cholesteatamatous masses which could be pulled out like ribbons. There was pus only at the tip. He established complete drainage from the antrum into the canal.

Dr. TŒPLITZ said that many more cases of cholesteatoma were reported in Germany than in America, probably because we don't call all these cases cholesteatoma.

Dr. COHN referred to the classification of cholesteatoma.

Dr. Dench agrees with Dr. Gruening about the insufficiency of simple incision in post-aural abscess in children. In all such cases coming under his care, the child is anæsthetized and a typical mastoid operation done. Always finds the bone soft.

Dr. WHITING has recently had two cases illustrating the point of Dr. Gruening about post-aural abscesses in children. A recent case, over the mastoid, was almost like a suppurating gland—it was so circumscribed. An incision revealed an abscess under periosteum, and two minute openings in the cortex which, under the curette, led through softened bone into the antrum. In a second case looking like a suppurating gland, he found a mass of pus under the periosteum, and held in position by sterno-cleido-mastoid and splenius capitis muscles at the tip.

Dr. KNAPP is in entire accord with Dr. Gruening in regard to these cases. One ought to go into the antrum in most of them. In two cases he found no pus in the antrum. The suppuration may originate in the cells of the posterior wall of the ear canal or the squamous portion, leaving the antrum free. As a rule, it is safe in these cases to go into the mastoid, and in the majority of cases we will find sufficient reason for having done so.

Dr. THOS. J. HARRIS reported a case showing **Marked Improvement in Hearing as the Result of the Use of the Bougie.** Had treated patient for chronic deafness first by catheter, and then with bougie. Six months ago, on using bougie, there was a distinct snap heard both by patient and by himself, followed by deafness and tinnitus lasting three days. Hearing then gradually improved, until now he hears conversation at several feet. Possibly bougie had caused rupture of some adhesive bands binding down one of the ossicles.

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G. P. PUTNAM'S SONS, Publishers

NEW YORK
27 & 29 WEST 23D STREET.

LONDON
24 BEDFORD ST., STRAND.

PUBLISHER OF THE GERMAN EDITION

I. F. BERGMANN

20 Schwalbacher Strasse, Wiesbaden.

EDITORIAL NOTE.

In asking for continued support of the ARCHIVES from subscribers and contributors, the Editors offer no new program, but point to the record of the work that has been accomplished during the past twenty-eight years. At the first appearance of the ARCHIVES in 1869, they constituted the only periodical of their class in America, and had only a few predecessors in Europe. The international character of the ARCHIVES was a novel and distinctive feature.

The original program of the ARCHIVES to publish only original papers in semi-annual independent numbers has, in the course of years, been extended by the addition of reviews of the current ophthalmological and otological literature.

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Since that date, the ARCHIVES have developed into an extensive and conveniently arranged storehouse of knowledge for the instruction of the student and for reference by the practitioner and the investigator.

For more than ten years, the valuable material offered to the ARCHIVES has been so abundant that it has not been practicable to utilize for the English edition the full series of papers from the German, or the converse. Many articles had to be abridged, while of others abstracts only could be printed. Any one of our readers could, however, have secured, and can secure in future, from the American editor, or the German publisher, the loan of the original papers presenting the complete text.

It is the purpose of the editors to arrange, in the department of Reports, for the review of every publication which in their opinion contains material that can be called distinctive and important. It is, of course, impossible, within the limits of the ARCHIVES or of any similar journal, to give attention to every publication in their department of science. We may state further that it is not a part of our program to furnish a complete report on the *bibliography*, but only on the **progress** of ophthalmology and otology.

Though the systematic arrangement of the reviews is of importance for reference and comprehensive information, we shall publish, as early after the meetings as practicable, reports of the proceedings of societies, always bearing in mind that the ARCHIVES are not intended to be only a repertory of knowledge, but also a journal of news.

It is natural that the English edition of the ARCHIVES should give the advantage of time and space to Anglo-American contributors over the German, and *vice versa*. It is evident, however, that the association of the two editions lends strength to each, furnishing to the authors a wider circulation for their papers, and to the readers a larger and more diversified field of information.

NOTICE TO CONTRIBUTORS.

The editors and publishers of the ARCHIVES beg to offer some suggestions to authors who propose to favor them with their contributions.

1 As original communications the ARCHIVES can accept only such papers as have never been printed nor are intended to be printed in other journals. If a preliminary communication on the subject of a paper has been published, the author is requested to state this in the letter accompanying his manuscript. It is understood that contributors to these ARCHIVES and editors of other periodicals will make no abstracts of the original papers published in this journal without giving it due credit for the same.

2. Authors will receive gratuitously twenty-five reprints of their articles. If a greater number is desired,—notice of which should be given at the head of the manuscript,—only the additional cost of presswork and paper will be charged to the author.

3. In preparing manuscript for the compositor it is requested that the following rules be adhered to:

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b. Write without breaks, *i. e.* do not begin a new sentence on a new line. When you want to begin a new line or paragraph at a given word, place before it in your MS. the sign ¶.

c. Draw a line along the margin of such paragraphs as should be printed in smaller type—for instance, all that is clinical history in reports of cases, etc.

d. Words to be printed in *italics*, should be underscored once, in SMALL CAPITALS twice, in LARGE CAPITALS three times.

4. Authors may receive proofs for revision if they will kindly return them without delay. We beg however to remind our contributors that changes in the copy are equivalent to resetting, causing so much additional expense. We therefore request them, to make, if possible, no alterations at all in their MSS., or, at least, to limit these to what is of essential importance.

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